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Index to Volume LV

JULY TO DECEMBER

1 9 2 5



Journal of Electricity

Published by McGraw-Hill Company of California
San Francisco, California

x f 621.3
J82 55

234685

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Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

J. W. OTTERSON, Associate Editor
G. R. HENNINGER, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

R. N. PHELAN, Associate Editor
B. H. SNOW, Northwest Editor

VOLUME 55

SAN FRANCISCO, JULY 1, 1925

NUMBER 1

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McGraw-Hill Company of California — 883 Mission St. — SAN FRANCISCO

Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

JAMES H. MCGRAW
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WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

McGraw-Hill Co., Inc., New York
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(Published in London)

Industrial Engineer (Published in Chicago)

Electrical Merchandising

Chemical and Metallurgical Engineering

American Machinist

Electrical World

Engineering and Mining Journal-Press

Bus Transportation

Coal Age

Engineering News-Record

Radio Retailing

Power

San Francisco's Moccasin Hydro Station

NO recent power development has received the publicity which has been accorded the Moccasin plant of the City of San Francisco's Hetch Hetchy development. While the controversy arising over the plant has been largely political, the project itself merits careful study by the light and power industry because of its completeness and its many new engineering developments.

In this issue of the Journal of Electricity is a full and complete description of the new 80,000-kva. generating station. All reference to the political phase has been omitted by the author, one of the engineers engaged in the design and construction of the plant. We recommend it to our readers for careful study. This is the first engineering article to appear on the project since the plant has been ready to operate.

In keeping with its plan to present articles covering the new power developments in the West, the Journal of Electricity has some fine treats in store for its readers during the coming months. Articles will be printed describing the Pit No. 3 plant of the Pacific Gas and Electric Company, the Valmont steam plant of the Public Service Company of Colorado, the Mystic Lake plant of the Montana Power Company, the Copco No. 2 plant of The California Oregon Power Company, and the Skagit plant of the city of Seattle. All of these stations represent the latest in Western hydroelectric or steam practice and are material additions to the installed generating capacity of the states west of the Rockies.

EXPENDED FOR GROWING UTILITIES

\$100,000,000 a Year Backed by Stone & Webster Experience

Pioneers for 35 Years



PUBLIC UTILITIES are successfully meeting a huge and fast-growing demand for electric light, power and transportation. Practically as old as the industry itself, the Stone & Webster organization has kept even pace with the extraordinary expansion of the utilities for thirty-five years.

Expenditures \$100,000,000 Yearly

Over \$100,000,000 yearly is expended through the Stone & Webster organization for public utilities construction, maintenance and operation. These activities extend into nearly every important State. The home office directing the financing, construction and operation of properties numbers 1500 people and occupies three acres of offices.

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Stone & Webster provides operating management for sixty separate public utility corporations. The record of these properties is an accurate measure of Stone & Webster operating and engineering skill and of the soundness of Stone & Webster financing.

During the war the strength and soundness of the utilities was severely tested. The demand for power rose to unprecedented heights but new financing was impossible. Under these conditions the Stone & Webster companies achieved notable results in maintaining both their physical condition and their record of dividends.

Stone & Webster service is in demand the country over. These facts show its value.

Construction 2,000,000 Horse Power Reports on \$4,500,000,000

Stone & Webster has examined and appraised properties to the total value of four and one-half billion dollars, including many of the country's foremost public utilities. Its construction of power stations aggregates 2,000,000 horse power.

The systems fed wholly or in part by these stations serve a population of 15,000,000—twice the population of New England. This includes 7,000,000 served by systems receiving power from Stone & Webster-built hydro-electric plants.

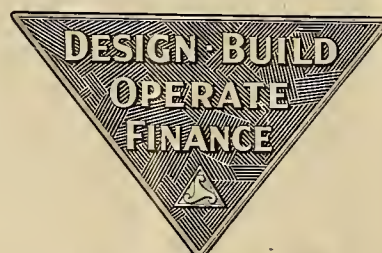
Power construction work in progress is a half million horse power. Three-quarters is for old customers who have learned that Stone & Webster-built stations pay dividends. This is because of the economy for which they are famous, and also because Stone & Webster knowledge based on actual experience of operating sixty widely-distributed utilities is available for extending old systems or planning new ones.

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The Securities Department of Stone & Webster rounds out and completes the organization's intimate contact with the public utilities industry. Through its operations in financing properties and handling their securities it provides thousands of individuals and institutions with favorable opportunities to invest their funds in electric light, power and transportation —fundamental necessities of modern life.

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EDITORIAL

Lessons of the N.E.L.A. Convention

THE forty-eighth convention of the National Electric Light Association held in San Francisco will go down into history as one of the most successful meetings ever held, a fine tribute to Frank A. Leach, Jr. and his committees for the hard work and attention to detail that made of the convention a smoothly running mechanism that performed its functions without a hitch at any time.

So much of unusual interest transpired at the convention that limitations of space prevent more than passing note. On other pages of this issue full reports of the various sessions will be found. The formal program arranged in New York by the officials of the N.E.L.A. was notable, particularly on account of the many national and international figures prominent in the world of power development, finance and economics. Few industrial organizations in the country could have received the recognition accorded to the N.E.L.A. by the presence on its list of speakers of two famous cabinet ministers and many other great leaders—a recognition of the growing importance of the electric light and power industry. According to A. Jackson Marshall, secretary of the N.E.L.A., the attendance at the sessions was higher than at any other convention, speaking in terms of the percentage of the total registration. This convention was a business convention, not a joy ride or a picnic, and the serious side of the meetings was recognized fully by those who attended.

To the many Western representatives of the electrical industry who were unable to attend the convention we recommend a careful study of the reports presented in this issue. Those who did attend will find in the events recorded herein a stimulus to their pleasant recollections of San Francisco and a permanent record of a week fruitful in concrete benefits to the electrical industry of the United States.

Los Angeles Creates Equity in Colorado River

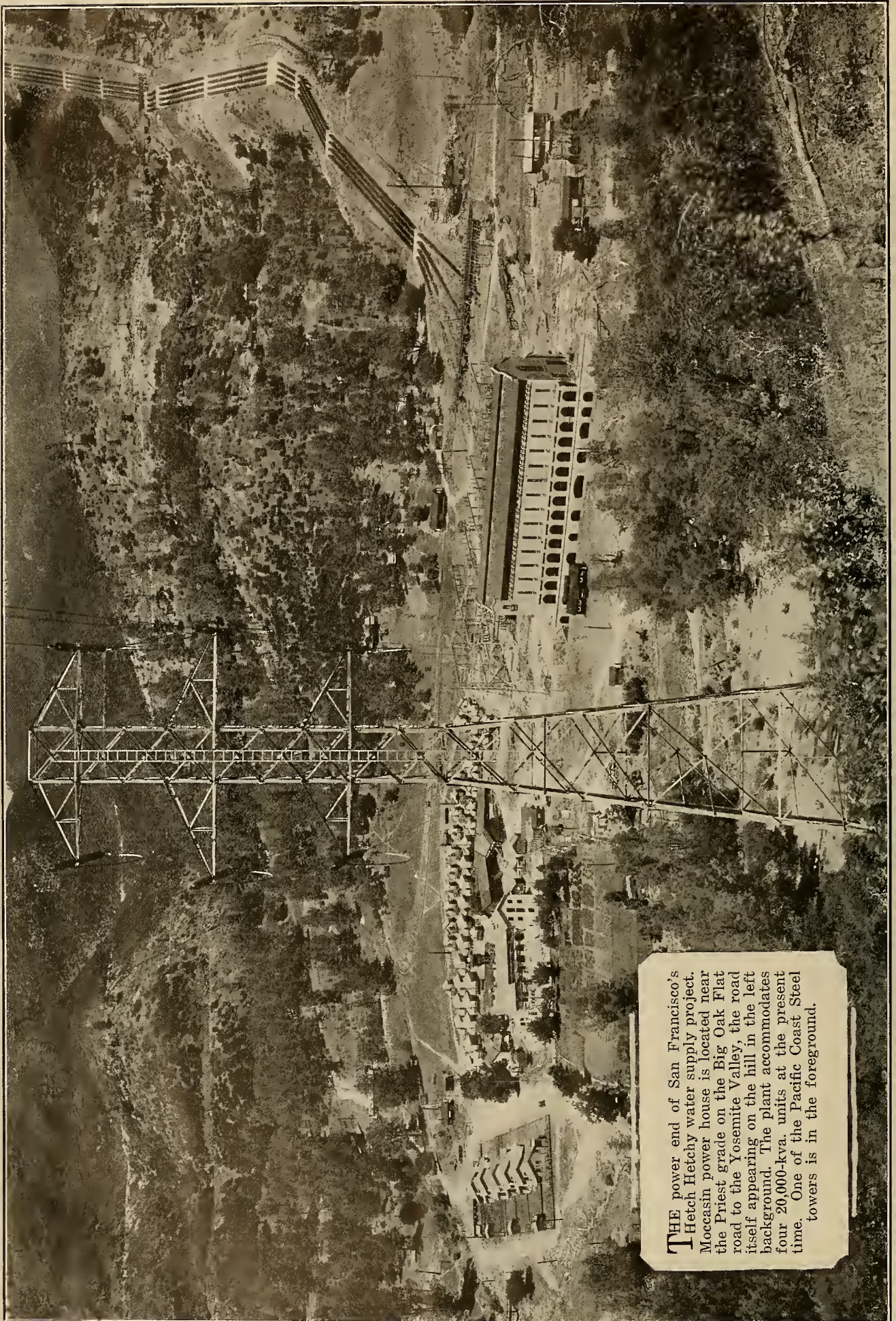
THE voters of Los Angeles have uncovered a new municipal gopher hole into which the politicians can pour an unceasing stream of tax-raised dollars. Bonds to the extent of \$2,000,000 recently have been passed by an overwhelming vote for the avowed purpose of investigating the possibilities of bringing a water supply into the city from the Colorado River.

The obvious purpose of the bond issue was to commit the voters to a program of development of the river in which Los Angeles could and would participate. Conceivably, this is the initial step in a plan which will require many millions more of the public's dollars. Later there will be other bond issues with the politicians claiming that the money previously voted had been expended in accordance with the mandates of the people. The clinching argument will be that if additional bonds are not voted, the millions already spent will be wasted.

The favorable vote of the people of Los Angeles on this "revenue-producing municipal improvement" affords the politicians capital argument. They now can go to Washington and represent to Congress that Los Angeles is fully committed to the Swing-Johnson bill, including the high dam and the All-American Canal, and that the people have backed their indorsement of these projects with millions voted for construction purposes.

On the surface Los Angeles' interest in the project is from the standpoint of a municipal water supply. Those familiar with the situation are of the opinion that power and not water is the goal of the municipal-ownership advocates. It is admitted generally that what Los Angeles wants is the opportunity to generate power from the Colorado and wholesale it to other municipalities throughout southern California. If a dam is constructed, power-producing possibilities immediately are created, and the path is open for the Bureau of Power and Light to claim distribution rights for this energy, not only for the city of Los Angeles alone but for other cities as well.

This is but another example of the history of all municipal light and power enterprises. The true magnitude and ultimate cost of a development are concealed carefully from the voters in the beginning. As money is spent, more money is asked, each time in an increasing sum. The project contemplated by Los Angeles would cost at a most conservative estimate \$150,000,000, yet the initial bond issue is for little more than one per cent of this sum. But \$2,000,000 will create a public equity in the project which must be protected, and the politician has a smooth way about arguing points like this. Once the start is made there is no way out except at an immense public loss. We wonder how many private enterprises could be financed on such a basis?



THE power end of San Francisco's Hetch Hetchy water supply project. Moccasin power house is located near the Priest grade on the Big Oak Flat road to the Yosemite Valley, the road itself appearing on the hill in the left background. The plant accommodates four 20,000-kva. units at the present time. One of the Pacific Coast Steel towers is in the foreground.

Year's Progress of Industry Recorded at Successful Convention

WITH two cabinet members and a number of leaders in business and industrial life of the nation, in addition to men and women prominent in all branches of electrical industry, the forty-eighth convention of the National Electric Light Association was held in the Municipal Auditorium, San Francisco, June 15 to 19, 1925. The relatively small registration of 3,000 scarcely reflected the enthusiasm and interest of the delegates because some of the sessions were attended by greater numbers than ever have attended the sessions of former conventions. Scarcely ever have the optimists dominated N.E.L.A. gatherings to a greater extent and never has enthusiasm run so high.

First among the addresses by distinguished visitors was that of Herbert C. Hoover, Secretary of Commerce of the United States, who spoke on some of the political aspects of the central-station business before an audience of 6,000 at the Public Policy

Committee Session on the evening of June 17. The part electricity can play in agriculture was the subject of an address by William M. Jardine, Secretary of Agriculture, before the third General Session the morning of June 18, while 3,000 public relations enthusiasts heard a symposium on "The Investor's Viewpoint," in which Haley Fisk, president, Metropolitan Life Insurance Company, and B. C. Forbes, Hearst Publications and Forbes Magazine, were among the principal speakers. Women's place in the industry was discussed at length by many women taking part in public-utility work, while Mrs. John D. Sherman, president, General Federation of Women's Clubs, Washington, D. C., represented the laywoman in this portion of the program, which occupied one afternoon session of the Public Relations Section. Commercial men found the sessions of their section filled to overflowing with load-building and revenue-producing ideas, and were loud in their praise of the committee work accomplished during the year, while Technical and Accounting Sections likewise proved of interest to the engineers and



FRANKLIN T. GRIFFITH

President of the Portland Electric Power Company who, as the retiring head of the N.E.L.A., presided at one of the most successful conventions in the history of the organization

accountants. The details of the convention handled by a dozen or more local committees headed by Frank A. Leach, Jr., vice-president and general manager of the Pacific Gas and Electric Company, was so perfect as to call forth nothing but praise from those attending the sessions. Likewise, the program, handled by the New York office of the N.E.L.A., was characterized as the most noteworthy ever prepared for one of the Association's meetings. The program was so diversified that it is difficult to discern a predominating theme. Customer-ownership, rural electrification, better public relations, and regulation of utilities furnished topics for constructive material in the general sessions.

In the public relations sessions, rural service and the place of women in the industry were the central themes. Once again the convention went on record as believing that private ownership and operation with sound public

regulation make for cheaper and better service.

In the commercial meetings the importance of the responsibility of this section of central-station business in maintaining prosperity and growth again was emphasized. From the load-building standpoint lighting, electric cooking and domestic refrigeration occupied the attention of sales executives.

The outstanding developments in engineering and operation were recorded in the technical sessions. Most of the reports dealt with improvements in economy of operation and reliability of service. The appointment of Col. William Kelly to the technical staff at headquarters met with general approval.

From a social standpoint Western hospitality played an important part in making the convention agreeable to the visiting delegates. The untiring efforts of committees charged with the entertainment of the guests left little to be wished for.

The general opinion of all in attendance may be summed up by the statement that the convention was an outstanding success in every department of its activities.

GENERAL SESSIONS

First General Session

An echo of 1915, the year of the last N.E.L.A. Convention in San Francisco, and of that other more tragic year, by which San Franciscans set all calendars, 1906, was brought into the opening session of the convention Tuesday morning. That echo was brought into the electrical assembly by way of contrast, and he who brought it in, Mayor James Rolph, Jr., did so to point to the achievements of the West, crushed by Nature's catastrophe, but indomitable and spurred on by such a blow.

Mayor Rolph's address of welcome to the delegates of the convention, a hearty and whole-hearted welcome, was followed by President Griffith's address. Few conventions have had the benefit of such scholarly and thorough survey of a past year as that presented by President Franklin T. Griffith before the session. The work of each section was reviewed in a comprehensive manner and the activities of the entire association in its many geographical sections summed up in such a way as to leave very little unsaid.

Reviewing first the beginnings of the association in 1885, with its membership of but sixty-five men and contrasting it with the present body, with a membership numbering over 15,000 men and women, President Griffith went on to say:

"The industry is doing more work now than it ever did before and doing it better than ever before. And this is in spite of increasing costs in all the materials which go into the production of electric energy, while rates have remained at the same or lower levels than in former years."

That this was due to the cooperative effort fostered by membership in the National Electric Light Association, was the intimation that he left with his hearers. He continued to show that these results had not been achieved without labor, that there had been dark days in the past, overcome by the indomitable spirit of American progress.

Griffith Discusses Superpower

Following a summary of the activities of the various sections of the association, President Griffith spoke briefly of some of the major problems confronting the industry. Of the much abused term, "superpower," he said:

"Its political aspects may be studied as long as you are on the mailing lists of your congressman."

Attention was called to the fact that the greatest progress in the field of so-called "superpower development" had been made on the Pacific Coast, and President Griffith took a sharp fling at the political demagogues who have been making capital out of "superpower" as a means toward general public ownership. He said:

It is unfortunate that this subject has been so uniformly distorted and misrepresented by our political and socialistic friends who prey upon the imagination and ignorance of laymen, and universally find it expedient to ignore salient and stubborn facts.

It is characteristic of this branch of our activities, as in all other phases of public utility business, that we are not permitted to do our day's work unmolested. For, while our en-

gineers and technical forces are engaging their best skill and energy in pushing this movement forward along its natural economic pathway, the political gadflies buzz around our heads and jam their stingers into our anatomies with ever-increasing zest and zeal. It is quite unnecessary, save for purpose of emphasis, to call attention to the untruth of the contentions of the public ownership propagandists that the extension of superpower facilities will mean any immediate or prospective reduction of rates for the services furnished to our customers. This desirable goal may be reached eventually through the ability of the interconnecting companies to inaugurate greater economies in production and operation, but it is an exceedingly remote contingency at this time.

Derides Municipal Ownership

President Griffith also rapped the public ownership advocates, who are clamoring for unlimited water-power development, as follows:

In every part of the country where there is a substantial amount of undeveloped water power, we are continually confronted with a mass of harmful propaganda relating to the cost of power and the militant doctrinaires who feel themselves and the public on the pap of public ownership are exploiting their theory and not the practical aspects of superpower in support of their contentions. There are hosts of writers and speakers on water-power subjects who freely assert that water power is the cheapest form of energy, and that its development necessarily means the establishment of power-consuming industries in districts having an abundance of potential water power.

Treasurer W. A. Jones followed with his report, in which he advocated the increasing of membership dues to care for association expenses, which have been in excess of revenues for the past few years.

Section Chairmen Report

M. S. Sloan, chairman of the Public Relations Section, in an excellent speech, reviewed the work of his section during the year and described the important part which public relations must play in future activities of the Association. "The very size and importance and prosperity of our industry make us a shining mark which is being shot at," he said, and then went on to show the means whereby public relations were being improved through the committee work of his section.

W. Paxton Little followed with an excellent resume of the activities of the Accounting National Section, laying stress on the section's work for a uniform classification of accounts and a standardization of annual reports to utility regulatory commissions.

W. R. Putnam, chairman of the Commercial National Section, in his report described the Commercial Section's study of conditions confronting the industry due to increasing loads on types of service which have low load factor and cost a great deal to serve. The seeking of means to fill out the "valleys" in the production curve, the building up of off-peak business, he showed, was drawing particular attention from the section at present.

H. P. Liversidge, chairman of the Technical National Section, wound up the committee reports for the morning. He described the Technical Section's work as serial, with study continuing through from one administration to another. A total of twenty-three serial reports had been completed last year, he showed. The appointment of a Director of Engineering was recommended by this section, he pointed out.

Second General Session

"How long should a wife live?" "How to keep 'em down on the farm," developments in lamp manufacture, and how group insurance helps establish better relations, were among the subjects discussed at the second general session Wednesday morning. Besides the presentation of four important reports, addresses were heard from Col. William Kelly, Hon. W. D. B. Ainey and Bruce Barton (by proxy).

The report of the Educational Committee was presented by its chairman, Fred R. Jenkins, Commonwealth Edison Company, Chicago. A continuing demand on the part of member companies for the various courses for employees has been manifest through the year, and a total of 1,897 subscriptions to the six courses offered by the committee was recorded in 1924, which was the largest in any year in the history of the committee.

Among the high spots of the report of the Rate Research Committee, presented by Alex Dow, Detroit Edison Company, Detroit, Mich., chairman, was in that portion of the report devoted to rural rates containing the suggestion that the congested urban districts should bear some portion of the cost of rural service, paying somewhat more in rates than they would pay if rural territory were not served. Citing the desirability of electrifying the farm as a means to keep labor on the farm, it was stated that rural rates should be constructed with consideration for the ideas of the farmer.

In the report of the Insurance Committee, headed by Charles B. Scott, Bureau of Safety, Chicago, the services rendered to the member companies in connection with their fire and liability insurance problems were discussed. Among the activities of the committee was a study of group life insurance, a detailed report being submitted without recommendations as an introduction of the subject to the companies. It was suggested that both the employer and employee have responsibilities and interests that may be combined in solution through some form of this insurance.

A reduction of about 40 per cent in the price of lamps since Jan. 1, 1922, a portion of which occurred during the past year, was brought out as an outstanding achievement of the lamp manufacturers in the report of the Lamp Committee, presented by Frank W. Smith, United Electric Light & Power Company, New York, chairman. The report listed a number of developments in lamp manufacture, and called attention to the attempt now in progress among manufacturers to standardize sizes with a view to reducing the number of sizes produced.

Bruce Barton's Paper Read

Money spent by the light and power companies for advertising is as well invested as money spent for fire insurance or set aside for plant depreciation in the opinion of Bruce Barton, president, Barton, Durstine & Osborne, New York, in a paper read by M. H. Aylesworth in the absence of Mr. Barton. According to Mr. Barton no plant can depreciate as fast as good will. The second portion of Mr. Barton's paper was devoted to the subject of women and from

it the paper got its name, "How Long Should a Wife Live?" He urged that today is the time for the electrification of the home, saying that "every day that we lose in this business of electrifying homes costs the nation in its richest wealth—the training of children, the lives and happiness of mothers." He pointed out that in the early days of this country the homes had two or three mothers and no motors. He concluded by saying:

The home of the future will lay all of its tiresome, routine burdens on the shoulders of electrical machines, freeing mothers for their real work, which is motherhood. The mothers of the future will live to a ripe old age and keep their youth and beauty to the end.

Judge Ainey Speaks

Hon. W. D. B. Ainey, chairman of the Public Service Commission of Pennsylvania and president of the National Association of Railway and Utilities Commissioners, forewarned the industry against the movement for federal regulation of the light and power industry. He sounded a warning note for utility commissions themselves when he said:

To meet the present pressure of a new development in an extended use of electricity for domestic and industrial use state commissions must awaken to a deeper sense of commission duty and responsibility. Their laws must be strengthened where now they are weak. Their administration must be wise, constructive and fearless, freed from the bias of politics and actuated by no other desire than to maintain that fair balance between the utilities under their jurisdictions and the public which is entitled to receive adequate utility service at reasonable rates. And once more, unless the public, the utility companies and the state commissions cooperatively undertake to support the more intimate regulatory policies which state commissions alone can apply, then some other answer will be found of much less advantage to the public and to all concerned—the lodgment of all or nearly all regulatory authority in some agency to be created and sitting in Washington.

Third General Session

Rural electrification, the Home Lighting Contest and the announcement of the various prize awards were the chief features of the third general session of the convention Thursday morning. The importance of the problem of rural electrification was impressed upon the audience by W. M. Jardine, Secretary of Agriculture, and L. J. Taber, Master of the National Grange.

W. H. Onken, Jr., editor *Electrical World*, reported for the prize awards committee. The following awards were made by the committee for the year:

Doherty Medal

Allen T. Early, Illinois Power & Light Corporation, Collinsville, Ill., for his paper, "A Manager's Privileges and Responsibilities."

Harriet Billings (\$50) Award

Albert J. Vogle, Commonwealth Edison Company, Chicago, Ill., for his paper, "The Basis of Our Industry."

H. M. Bylesby (\$250, \$150 and \$100) Awards

1—J. A. Rockwood, Portland Electric Power Company, Portland, Ore., for his paper, "Increasing the Usefulness of the Accountant to the Public-Utility Industry."

2—H. L. Gruehn, Consolidated Gas, Electric Light & Power Company, Baltimore, Md., for his paper, "Development of Analysis."

3—P. O. Johnson, Minneapolis General Electric Company, Minneapolis, Minn., for his paper, "The Accountant in Public-Utility Work."

Martin J. Insull (\$250) Award

Richard F. Kunkel, Commonwealth Edison Company, Chicago, Ill., for his paper, "How Sound Public Relations Between Public Utilities and Committees Can Best Be Developed and Maintained."

James H. McGraw (\$250, \$150, \$100) Awards

1—R. H. Lang, Consolidated Gas, Electric Light & Power Company, Baltimore, Md., for his paper, "Provisions Made for Continuity of Electric Service."

2—Francis E. Andrews, Public Service Company of Northern Illinois, Chicago, Ill., for his paper, "Transmission Tower-Line Engineering and Construction."

3—W. F. Oberhuber, Philadelphia Electric Company, Philadelphia, Pa., for his paper, "Factors of Operating Efficiency and Economy with Particular Reference to Maintenance of Power-House Equipment."

Arthur Williams (\$250) Award

Nathan Roberts, Ohio Public Service Company, Cleveland, Ohio, for his paper, "Industrial Electric Heat."

Frank W. Smith (\$100) Prize

Franklin C. Eteson, Blackstone Valley Gas & Electric Company, Pawtucket, R. I.

Home Lighting Contest for Central Station Employees

1—Miss Helen E. Beisel, Nebraska Power Company, Omaha, Nebr., \$500.

2—Clyde N. Robinson, Public Service Company of Northern Illinois, Chicago, Ill., \$300.

3—H. C. Cox, Kansas Gas & Electric Company, El Dorado, Kan., \$200.

The winners of the Bonbright prize were announced by President Griffith. The \$10,000 in prizes for the best papers reviewing the progress of the electric light and power industry for the decade 1920-30 offered by Bonbright & Company, New York, follow:

First prize, \$5,000: David Cowan, investment department, Sun Life Insurance Company of Canada, Montreal.

Second prize, \$1,000: R. M. Davis, statistical editor, Electrical World, New York.

Third prize, \$500: John Dockendorf, statistical division, Milwaukee Electric Railway & Light Company, Milwaukee.

Ten prizes, \$250 each:

Reuben B. Sleight, engineer Minnesota Tax Commission, Minneapolis, Minn.

Arthur R. Stubbs and Charles H. Churchill, Jr., in collaboration and working with the assistance of seven of their associates, all of the Adirondack Power & Light Company, Schenectady, N. Y.

C. E. Neil, of the publicity department of the North American Company, and Charles Donaldson of Curtis, Fredric & Belknap, New York City, working in collaboration.

M. L. Sindeband and P. Spron, of the American Gas & Electric Company, New York, working in collaboration.

A. K. Baylor, of the merchandising department of the General Electric Company, New York.

C. P. Dunn, designing engineer, Portland Electric Power Company, Portland, Ore.

C. T. Chenery, New York City.

Theodore Dwight of Murray & Flood, New York, and Reginal Trautschold of Montclair, N. J., in collaboration.

David Evans, Jr., Montclair, N. J.

M. J. Verdery, Jr., of Bonbright & Company, New York, and H. A. Moe of New York, in collaboration.

Ten prizes of \$100 each:

F. E. Pierce and R. T. Dana, Construction Service Company, New York, in collaboration.

Merrill E. Skinner, commercial manager, Duquesne Light Company, Pittsburgh, Pa.

Paul A. Ryan, Susquehanna, Pa.

Pearson Winslow, Bonbright & Company, New York.

Louis R. Davis, secretary, Business Research Corporation, Chicago, Ill.

Chester M. Clark, Boston Banking House, Boston, Mass.

Edgar A. Van Dusen, hydraulic and structural engineering, Central Hudson Gas & Electric Company, Poughkeepsie, N. Y.

Prof. T. H. Dillon, professor of public utility management, Graduate School of Business Administration, Harvard University.

Theodore H. Brown, Stamford, Conn.

Frank H. Simmons, Blackstone Valley Gas & Electric Company, Woonsocket, R. I.

In a letter addressed to W. R. Putnam, Idaho Power Company, Boise, chairman of the Commercial National Section, Edwin N. Hurley, president of the Hurley Machine Company, Chicago, announced the donation of a fund of \$10,000 to the N.E.L.A. to be offered to the electric light and power company which, during the next year, develops the most constructive method of merchandising electric appliances. The fund has been offered as a stimulant toward the improvement of methods of distribution.

One of the most outstanding features of the Home Lighting Contest has been the manner in which the industry has kept faith with the public, according to the report of J. E. Davidson, Nebraska Power Company, Omaha, chairman of the Lighting Educational Committee. Throughout the contest there was no propaganda of any kind, Mr. Davidson reported. He stated that 74 per cent of the population served by electricity was organized for the contest. The advertising value of the contest publicity to the industry is in excess of \$4,000,000.

Following his report, Mr. Davidson presented to Miss Julia Groo of Portland a replica of the \$15,000 electrical home which she won in the contest. In her remarks of acceptance Miss Groo urged that the industry continue its efforts to educate the children and the women of the home regarding better home lighting. A check for \$1,000 was presented to John F. Gilcrest, Commonwealth Edison Company, Chicago, as the regional director whose section made the best showing in the contest.

Public misconception regarding the development of the nation's water powers can be overcome only by giving the people a proper understanding of the relations between the power companies and the state and federal governments, according to Wigginton E. Creed, president, Pacific Gas and Electric Company, and chairman of the Water Power Committee. This report says:

The public should be educated to a realization that the power company has installed its plants and built its lines in the public interest, and by doing so it has merely reduced the energy of mountain streams to the service of the public. It should know that each step of the way is safeguarded; that no federal right or property is given up or parted with; that state water is not taken unless it can be shown that by its taking the public is benefited.

The report showed that power developments authorized by the Federal Power Commission but not yet begun will require at least a billion dollars to complete and two billion dollars more for transmission lines and distribution systems. Applications now pending will require ten billions for the development of the 20,000,000 hp. and the construction of transmission and distribution systems. Rapid as has been the development of the industry, it is obvious that only a portion of this power can be utilized in the time limit set by law. The report censures such

a practice, classing it as speculation in federal power permits. In this respect the report states that it would be in the public interest to clothe the Federal Power Commission with some latitude of discrimination in the issuance of permits and licenses, authorizing only developments of utilities supplying service and in a position to utilize the power applied for or isolated industries which can show that the power to be developed will be put to a beneficial and efficient use.

Regarding the co-ordination of steam and hydroelectric developments, the report says:

While water power cannot be expected to supplant any appreciable amount of steam, it is growing more and more apparent that the development of water power will to a considerable and increasing extent depend upon steam reserves to carry peak loads and to provide service in the event of interruptions to the water supply or the transmission circuits.
* * * * *

Hydroelectric development in this Western area will gradually extend to more remote streams and to streams of less dependable flow. The result will be a greater reliance upon steam power. Reserves once considered ample will no longer safeguard service and more and larger sources of auxiliary or emergency power will become necessary. * * * * *

The policy of the federal government with respect to water power development has been clearly defined and the principle of state regulation firmly established. The continued development and utilization of these resources will hereafter depend largely upon local conditions. Each project must be considered in the light of its cost as compared with the cost of alternative sources of power that may be available. Generally speaking, in the East and South water power will be developed as an auxiliary to, and occasionally as a substitute for, steam wherever economic conditions make it practical. In the West water power will continue to be the primary source of power, but will rely to an increasing extent upon steam to ensure continuity of service.

In conclusion the report said:

It perhaps cannot be too often repeated that in the development of water power the course of the industry has been steadily upward. Great scientific advances have been made and innumerable physical obstacles overcome. Always the goal has been towards cheaper and better service.

All that has been accomplished has been done through private courage and initiative. Nothing like it could have been attained through the restricting influences of government ownership, federal, state or municipal. Thinking people know this and today see less need for government management or ownership than ever before. As President Coolidge once said: "The government and its agents are not in possession of any resources, ability, wisdom or altruism except that which they secure from private life."

The portion of the meeting devoted to rural electrification was opened by G. C. Neff, Wisconsin Power, Light & Heat Company, Madison, chairman of the Rural Electric Service Committee, who presented a report which showed that there is 50,000,000 primary horsepower on the farms of the United States, producing sixteen billion horsepower-hours of work costing the farmer three billion dollars, or approximately 25 cents a kw-hr. Owing to the diversification, this load could be carried by one-quarter of that amount of central-station capacity. It is estimated that 2,000,000 hp. or four per cent of this load is served electrically. If electric motors were to replace steam and gas engine-driven equipment, this could be increased to 12,000,000 hp.

The report recommends that any utility starting a rural electrification drive should organize a rural department in charge of a man who is familiar with rural problems. Before lines are built, it is recommended that careful surveys be made. Rural rates

should be based upon a standard which will protect the utility investment and at the same time be favorable to the farmer. It urges that utilities finance the construction of rural distribution lines wherever possible and that the necessary help be given the national and state Committees on the Relation of Electricity to Agriculture so that the work being carried on at the present time may be continued.

Presenting the second annual report of the Committee on the Relation of Electricity to Agriculture, E. A. White, director of the committee, stated that "committees organized for the specific purpose of making a comprehensive study of the rural electric service problem are functioning in seventeen states—New Hampshire, New York, Virginia, Alabama, Ohio, Indiana, Illinois, Wisconsin, Minnesota, South Dakota, Iowa, Kansas, Oklahoma, California, Oregon, Washington and Idaho. The interest in the subject is not confined to any particular region or type of farming, and, according to the speaker, rural electric service is receiving attention in many foreign countries.

Discussing the number of farms that are within the reach of central-station lines, Mr. White stated that at least 25 per cent of the 6,484,383 farms in the United States were so situated. To reach approximately 1,500,000 of these farms with electric service, Mr. White considered that three farms could be reached with each mile of line. Construction charges, estimated at \$1,000 per mile of distribution line, would amount to \$500,000,000 to reach less than one-fourth of the country's farms. He continued:

Data now available leave no doubts that to use electric service properly the individual farmer should spend for wiring and equipment at least two dollars for every dollar which goes into distribution lines. Here is \$1,000,000,000. Adding these two sums, we find that to make rural electric service at all effective, on less than 25 per cent of our farms, is a financial undertaking of \$1,500,000,000, or four times the money spent by the United States in building the Panama Canal. Certainly an undertaking of such magnitude calls for ability of no mean order. Each group, agriculture, your light and power industry, equipment manufacturers, will be justified in taking more than a casual glance before it leaps.

National Grange Leader Speaks

Stating that the American farmer is anxious to secure the benefits of electricity for his family and workmen, L. J. Taber, Master of the National Grange, discussed the possibilities of electric service on the farms of this country. In his opinion the electrification of the farm will be an inestimable boon to agriculture and will offer one of the greatest potential markets to the electrical industry.

In discussing practical means of securing this farm electrification Mr. Taber said:

Let us remember that we should seek to develop good will and understanding, and to this end power companies and manufacturers should recognize basic facts. Agriculture must not be exploited either in developing the right of way or equipment. The rate contract should be simple and understandable; the farmer will want to figure his own bills. Development costs must be paid, but the farmer must not be asked to experiment.

Light and power companies need rural-minded men in connection with the business affairs. This is especially true when exercising the right of eminent domain. We American farmers retain strongly that Anglo-Saxon instinct that makes us feel that our farm is our castle, and we feel that power lines should not be placed over our farms without proper

compensation and without the use of the current carried. In figuring rates and in rural extension and in recommending farm equipment, the power companies should rely upon men with a knowledge of farm problems.

This meeting and the movements that will flow from its committees and its activities can be of incalculable value; first, in developing better understanding between agriculture, the power interests and the manufacturers; second, in making clear the problems that affect the farmer; and third, the working out of a program that will benefit agriculture and the industries involved.

Mr. Taber stated that in the past the central stations and the manufacturers of electrical equipment have given more attention to meeting industrial needs than they have to solving the problems of the farmer. Electric service means more to agriculture than to almost any other industry, and the Master of the National Grange is of the opinion that farm electrification warrants increasing attention from the entire electrical industry.

Rural Electrification Discussed by Secretary Jardine

Stating that as much primary power was available on the farms of the United States as is available to the manufacturing and electric power industries combined, W. M. Jardine, Secretary of Agriculture, brought out the fact that agriculturists are handicapped seriously in the efficient utilization of this power. The seasonal character of the demand and the need for decentralized operations have brought about a very low power load factor and a relatively high cost per unit of power utilized.

That the electrification of agricultural operations would aid in the solution of the problem concerning the provision of more power for this service, was suggested by Secretary Jardine who said:

The adoption by agriculture of electrical distribution of its power would appear to be one means of overcoming some of these difficulties if certain other difficulties connected with the distribution of electrical energy can first be overcome. The relatively high cost of transmission-line construction, coupled with the low load factor obtained, the mobile nature of many of the farm operations, and the lack of fundamental information on which to base the charges for the current consumed, have prevented the wide application of this type of power to farm operation. The best information available would indicate that in the United States something like 500,000 farms are at the present time equipped with some kind of electrical power service. Here in California, where rates are somewhat more favorable, and where the type of agriculture lends itself more easily to the utilization of electrical power, I understand fully fifty per cent of the farms have this service and that the amount of electrical energy utilized annually is practically equal to that supplied by both animal and tractor power combined.

The most serious difficulty connected with the distribution of electrical energy to rural communities seems to be to get the average customer to use sufficient current to give the central stations a reasonable return on their investment without making an unreasonably high charge per unit of energy consumed. In most cases, when a rural line has been constructed the farmers have availed themselves of it for supplying lights to their houses and barns and perhaps for the operation of a few small machines requiring little current, but they have not extended its use farther. Obviously, the central service stations cannot be expected to invest money in rural service extension unless they receive a reasonable return on their investment. On the other hand, it must be recognized that agriculture cannot utilize electrical energy extensively unless its cost and the returns from its use are such as to make the practice profitable. The farmer has a keen understanding of relative power costs as they apply to his conditions and he employs only those practices that yield the larger profit.

After calling attention to the fact that it was essential that the consumption of each rural customer

be increased to warrant the expense of line extensions, the Secretary stated that in his opinion the only way for electricity to compete with other types of power is to accomplish the work as economically. His suggestions as to ways of reducing the costs of electric service in rural communities included the adoption of the most economical types of transmission systems consistent with good service and public safety, and the manufacture of electrical equipment designed to fit agricultural conditions. In closing he stated that "the farm opens the greatest potential opportunity open to the electrical industry."

Fourth General Session

At the fourth general session Friday, June 19, the report of the wiring committee was summarized by A. Jackson Marshall, secretary of the National Electric Light Association, in the absence of R. S. Hale, The Edison Electric Illuminating Company, Boston, chairman of the committee. Among the more important matters discussed by this committee during the year were the principle that new developments should not be put in the Code until they have been tried out by local inspection departments, and the acceptance of the idea of thorough grounding of the neutral.

John W. Lieb, New York Edison Company, New York, gave the report of the N.E.L.A. representative to the United States Chamber of Commerce. He mentioned some of the work accomplished by some of the bureaus, including the agricultural and the business ethics bureau, the latter covering a code of sound business conduct.

Mr. Lieb also reported for the National Industrial Conference Board, whose work covers scientific industrial economic research. During the last year he stated it had expanded considerably and had received the affiliation of several governmental departments. He mentioned particularly their work regarding trade associations and the establishment of uniform medical provisions in the workmen's compensation laws in the various states.

The report of the memorial committee was given by W. H. Onken, Jr., editor, *Electrical World*, and chairman of the committee. Mr. Onken told of the accomplishments and ideals of those distinguished members of the industry who have died during the last year. Included among the more prominent names on this list were Benjamin G. Lamme, Milan R. Bump, Lucian L. Nunn, John L. Harper and James A. Lighthipe.

Railroad Electrification Discussed

W. S. Murray, Murray & Flood, New York, presented the report of the committee on electrification of steam railroads in the absence of Frank R. Coates, chairman of the committee. This report includes a statement made by Herbert Hoover, Secretary of Commerce, before the American Institute of Electrical Engineers, in which he urged that standardization in fundamentals be made because of the benefits it will return and because of the large losses it will prevent. It presented the accomplishments which have been made in steam road electrification

in the United States, and a statement of the contemplated electrification. An outline was included of what has been accomplished abroad in the electrification of steam roads. The committee urged that a study of the problem be made by representatives of both the railroads and the utilities and suggested this be done by a committee of the American Railway Association and the National Electric Light Association, each committee of which could operate individually and collectively as a joint committee in the consideration of the principles involved.

Mr. Murray also delivered an address on the subject of servicing railroad electrification. He stated that electrification was especially advantageous in zones of heavy congestion. He urged that the electrical industry meet the railroads more than half way and that they make this their problem. He stated that the finances of the railroads were in such a condition that they cannot spend the great sums necessary for electrification; that investment dollars could not be spent to save dollars lost in operation. He said the electrical industry should lift the burden as much as possible, and suggested one means of doing this would be to supply power direct to a standardized overhead contact system.

Paul S. Clapp, U. S. Department of Commerce, Washington, D. C., addressed the meeting on steam railroad electrification. He stated the problem was one of great importance as it reaches into national and industrial relations, and must be approached with a realization of the public obligation involved. He said most of the work would rest with the railroads themselves, but they must be aided in every way possible by the electric utilities and the manufacturers. He stated the railroads are our largest undertaking representing an investment of over \$21,000,000,000. Mr. Clapp pointed out that electrification would be facilitated by action in two major directions: first, the development of interconnected central-station systems, as a source of power supply; and secondly, by the adoption of certain standards which will enable the development of a unified transportation system and simplify the equipment.

Paul Shoup, vice-president of the Southern Pacific Company, San Francisco, gave an address on the necessity of moving on. He stated the organizations with which he was affiliated were already interested in electrification and have had experience in the value of it. He emphasized the important role played by the railroads in the life of the nation. Actual figures were presented by him to show that there was nothing excessive or prohibitive in the freight rates as they now exist. He also stated it would not be a burden on the people to protect themselves and at the same time enable the railroads to earn an adequate return on their investment. Mr. Shoup called attention to the losses which have been caused the railroads in recent years by the equalization of rates. He said the public must have a broad view of the needs of the transportation industry and its relation to national life.

W. S. Murray presented a resolution providing the establishment of a committee to study the problem of steam railroad electrification with a primary ob-

jective of recommending possible standard types of power to be supplied overhead contact systems, this committee to report at the 1926 convention of the National Electric Light Association. The resolution also suggested that representatives be secured from the following organizations to serve on this committee: American Railroad Association, National Association of Railroad and Utilities Commissioners, National Electric Light Association, American Telephone and Telegraph Association, American Institute of Electrical Engineers, and the Department of Commerce.

W. D. B. Ainey, president National Association of Railway and Utilities Commissioners, stated that administrative problems must be left on the shoulders of men in the industry. He said regulatory bodies were needed but that they should not have managerial control.

Shun Suzuki, manager, department of foreign relations, Toho Electric Power Company, Ltd., Tokyo, Japan, addressed the meeting on the Japanese electrical industry and American finance. He spoke of the recent flotation of a \$15,000,000 bond issue in this country, stating this was done because cheaper capital could be secured for longer periods. He expressed a desire to have the electrical industry in this country cooperate with that of Japan in aiding its development. He said the interests of American investors were safeguarded in bonds in Japanese public utilities.

Martin J. Insull, Midwest Utilities Company, Chicago, presented the report of the nominating committee as follows: president, J. E. Davidson, Nebraska Power Company, Omaha, Nebr.; vice-president, R. F. Pack, Northern States Power Company, Minneapolis, Minn.; vice-president, H. T. Sands, Charles H. Tenney & Company, Boston, Mass.; vice-president, P. S. Arkwright, Georgia Railway & Power Company, Atlanta, Ga.; vice-president, J. B. Miller, Southern California Edison Company, Los Angeles, Calif.; treasurer, W. A. Jones, Henry L. Doherty & Company, New York; executive committee members for three years ending June 30, 1928; Edwin Gruhl, North American Company, New York; E. M. Herr, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.; and H. M. Edwards, New York Edison Company, New York City; executive committee members for one year ending June 30, 1926: Clyde L. Chamblin, California Electrical Construction Company, San Francisco, Calif.; and W. E. Robertson, Robertson Cataract Company, Buffalo, N. Y.

Other members of the national executive committee are: managing director—M. H. Aylesworth, National Electric Light Association, New York; secretary—A. Jackson Marshall, National Electric Light Association, New York; members at large—Franklin T. Griffith, Portland Electric Power Company, Portland, Ore.; H. C. Abell, Electric Bond & Share Company, New York; W. A. Layman, Wagner Electric Corporation, St. Louis, Mo.; E. W. Lloyd, Commonwealth Edison Company, Chicago, Ill.; I. E. Moulthrop, Edison Electric Illuminating Company, Boston, Mass.; and Harry Reid, Interstate Public Service Company, Indianapolis, Ind.

PUBLIC POLICY MEETING

Upholding state regulation as opposed to federal regulation as a wholly unnecessary invasion of local responsibility, Herbert C. Hoover, Secretary of Commerce, took issue with the advocates of municipal, state and government ownership of the electric light and power industry before 6,000 people at the public policy committee meeting Wednesday night. The speech was broadcast over KGO.

In reviewing the revolution now taking place in the power industry as the result of development of long-distance transmission and consequent economies from the erection of large central generating stations and interconnection of distributing systems, Secretary Hoover said:

I do not propose to refer to this as either "superpower" or "giant power." Both these terms are blamed with connoting something that is not existent in power production. "Superpower" has been envisaged as some overwhelming sinister encroachment into public rights. "Giant" power has been interpreted by extremists to be like any giant hitherto known, having its only realism as a bogey, as entertainment for children, or as a sideshow for the political circus. However, the practical everyday fact is that all this development is simply a centralization of power houses and interconnection of distributing systems. We had better stick to our engineering terms to describe what the thing really is—central generation and interconnection of distribution systems. If anybody can find evil or humor or poetry in these terms, he will need to be ingenious.

Regulation of Utilities

He stated that central generation and interconnection do not in any way alter the essential character of regulation. He continued:

During the past year the Department of Commerce has been engaged upon a study into the effectiveness and the results of state regulation of the industry. It is scarcely necessary for me to say that there is either state or municipal regulation of the rates of electrical utilities in all but two of the states, and of service in all but five of the states. The financial operations of such utilities are supervised and controlled in a large majority of the states. These principles are being rapidly extended over the few remaining states.

It seems to me that there are two final tests of this question. First: Is the service adequate and is the industry progressive in its provision for future need? Second: Are the rates reasonable in themselves and are the profits taken by the industry upon the capital invested extortionate?

In the national sense the industry is acquitting itself well in service. Its initiative in scientific investigation, in application of discovery, its extension of service, is of the highest order of American business. The service leads all others in the world and it improves every year.

As to the reasonableness of rates, it may be observed that the nation-wide average shows that rates are today slightly below pre-war, and this despite an increase of 100 per cent in wages, together with increased cost of fuel and of many supplies. While the price per kilowatt has shown a small decline since before the war, yet beyond this the technical improvement in lamps has resulted in a four-fold increase in the amount of light dispensed for the same money.

It has been proposed that as power districts may be no respecters of state lines, we must have federal regulation of power. I do not agree with the conclusion that federal regulation is necessary. I can see no reason for the imposition of a superior regulation, merely because the Congress may have the power to exercise its authority under the commerce clause. There are the most weighty of reasons against federal regulation. Power is by necessity bound to be local in its districts—as to its service, its generation and distribution. It differs widely from the interstate implications of the railways where they are dependent not upon districts but upon whole groups of states. Local acquaintance, local valuation and public opinion can operate upon power to their fullest extent. Nothing will produce worse service than to attempt to transfer local problems to absentee solution at Washington. And if our democracy will stand at all it must stand upon

the local responsibility. Nothing could be a more hideous extension of centralization in the federal government than to thus undermine the state utility commissions and state responsibilities.

Regulation of Municipal Plants

He recommended that in those states where municipally owned plants are immune from state regulation that they should be required to maintain uniform accounting and submit their accounts to the state commissions in order to enable the local communities to judge the competency of their managers and for the nation properly to judge the value of municipal ownership versus private ownership. He pointed out that municipal plants cover but three per cent of the power being generated in the country.

He recommended that no embargoes should be placed on the free flow of power across state boundaries, pointing out that it is against the long view interest of the originating state. He strongly recommended that there should be immediate cooperation between state utility commissions and the industry for full and complete study of the resources and demand of every state in order that long view plans may be made for the location of central steam plants under the most economic conditions.

Interconnection Developing

He emphasized the necessity of the industry taking in hand the development of the spread of power to the farms and rural development generally. He said:

Concurrent with the expansion of central generation has been the evolution of the power district as distinguished from the individual town system. The outlines of these regional power districts have emerged in probably 50 per cent of the important power consuming areas of the country.

The wider interconnection between these regional systems is also proceeding apace. For this again makes use of the power capacity below the peak load by an interstate diversification. Such a flow of electricity will soon be traceable through the many regional systems continuously from Montana west to the Pacific, thence south to Mexico—a total of 1,800 miles. Shortly, power tie-ins will be completed in the Middle West and the Southeastern areas, coursing all the way from Wisconsin and Michigan around through West Virginia and North Carolina to Arkansas and Louisiana.

A still larger amount of the horsepower now produced in local factories will be displaced by purchase from central stations. We are just entering the stage of electrification of transportation. Present users will increase their requirements, new uses will be discovered. The power district as distinguished from the town systems is making possible the extension of service to the farms. At our present rate of increased requirements, by 1930 central stations for the country will probably need an additional capacity of fully 30 per cent, carrying them up to nearly 36 million horsepower. Probably five billion dollars of additional investment will be required.

The most of this increase will be supplied by steam generation. The public is generally under some illusion as to our water power resources. In the districts east of the Mississippi, where 76 per cent of our power of all kinds is generated today, if every drop of water that is economically useful were actually harnessed they could supply less than 15 per cent of the requirements.

The complete text of Secretary Hoover's address will appear in the July 15 issue of the Journal of Electricity.

Prior to Secretary Hoover's address, Martin J. Insull, Middle West Utilities Company, Chicago, read the report of the public policy committee. The report emphasized the importance to the industry of

the rural electrification program and customer-ownership and pointed out the dangers of federal regulation and municipal, state and government ownership.

Coffin Medal Awarded

A third feature of the meeting was the presentation of the Charles A. Coffin Medal to the Consumers Power Company of Jackson, Mich. The award was made by President Griffith to T. A. Kenney, vice-president of the company.

This is the second year that the medal has gone to a Middle Western company, it having been won last year by the Public Service Company of Northern Illinois. It was won the first year by the Southern California Edison Company. The Consumers Power Company is the third utility to join the distinguished group made possible by the Charles A. Coffin Foundation organized by the General Electric Company.

Among the achievements of this company, outlined by President Griffith as the basis of the award were:

It increased its consumers by 11 per cent during the year bringing the total to 200,000, residing in 170 communities. This increase was paralleled by an increase in kw-hr. to resident consumers of 21 per cent and to commercial consumers of over 17 per cent. Eighty-seven per cent of the homes in the territory served now have been electrified.

During 1924 the company completed a home-service visiting campaign, during which over 167,000 visits to customers were made by employees. Nine-

The number of employees of the company owning stock increased 23 per cent during the year. The company has 17,966 customer-stockholders, representing a gain of 55 per cent in the number of holders in a year.

Its expenditures in 1924 in order to build greater service totaled \$12,700,000. During the year over 244 miles of transmission lines were built of which 123 miles carry 140,000 volts. Distribution facilities increased 13.5 per cent. Its 1924 projects included five new 140,000-volt substations.

Considerable public approval was secured as a result of the reforestation of the territory surrounding its hydroelectric plants. The company has gone out of its way to aid in the propagation of fish in the streams near its hydro stations and has established camping accommodations for tourists.

In addition to the certificate of award, the company received a check for \$1,000 for its Employees' Benefit Association.

PUBLIC RELATIONS SESSIONS

In a program of three sessions, colorful with the names of men and women prominent in business and public life of the nation, the Public Relations Section completed the most significant and instructive presentation of its problems in its history. If one single impression of all the meetings was stamped deeper than any other on the composite consciousness of the thousands of delegates that attended them, it was perhaps that the subject was so large that only by crowding the allotted time to the limit was the section able to cover all phases of its work.

New light was thrown on such subjects as the relation of investment and finance to public relations, the place of women in the industry, the dissemination of information to the public, the value of utility and manufacturers' advertising, relations with educational institutions, customer-ownership, and employee relations, while in the words of such men and women as Haley Fiske, B. C. Forbes, Francis E. Frothingham, Henry Swift Ives, Henry M. Robinson, and Mrs. John D. Sherman was found reflected the favorable attitude of the enlightened layman toward the activities of the Public Relations Section and its place in the N.E.L.A.

No mention of the work of the section for the year would be complete without reference to its chairman, M. S. Sloan, Brooklyn Edison Company, Inc., Brooklyn, N. Y., whose administration was commended particularly by the nominating committee when it expressed the hope that the section might have the benefit of his leadership for another year.

First Public Relations Session

The prosperity of the electrical industry depends on the extent to which the good will of the public is



Franklin T. Griffith, N.E.L.A. president, presented the Coffin Medal to T. A. Kenney, vice-president of the Consumers Power Company—the 1924 winner of the award.

ty-eight and four-tenths per cent of the customers expressed satisfaction with the service that was being rendered, showing a 57 per cent decrease in complaints over the previous year.

Great activity was displayed in promoting efficiency by reducing the number of accidents and the number of hours lost due to accidents during 1924 was reduced 43.8 per cent over 1923. One hundred meetings on the subject of accident prevention were held and many bulletins were sent out.



M. S. SLOAN
Chairman, Public Relations
Section

procured and maintained. This is the most serious and permanent problem confronting the industry today. With these statements, chairman M. S. Sloan opened the first session of this section, held in the afternoon of June 16. He showed that the problem was to make the public understand that the utilities were not primarily working for their own pockets, but that they were placing "responsibility before profits."

The first report presented was that of the committee on cooperation with educational institutions, by John C. Parker, Brooklyn Edison Company, Inc., chairman. The report showed that the work of the committee had been directed toward "bringing about a better and closer relation between the industry and schools of business administration and departments of economics in the higher educational institutions."

Advertising

Next followed the report of the manufacturers' advertising committee, presented by P. L. Thomson, Western Electric Company, New York, in the absence of J. C. McQuiston, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., chairman. In this it was brought out that during the year 60 manufacturers had assisted in telling the utility story to the public through advertising. Exhibits were shown of some of this material and the case of three advertisers who consistently had kept up a good will advertising program for the utilities throughout the year was cited. These were Westinghouse Electric & Manufacturing Company, General Electric Company and Western Electric Company.

The report of the advertising survey committee followed, being presented by George F. Oxley, publicity director of the N.E.L.A., in place of the chairman of the committee, Joseph B. Groce, The Edison Electric Illuminating Company, Boston, who was absent. Mr. Oxley stated that approximately \$7,000,000 was spent last year by the utility companies in advertising, of which one-half was spent for newspaper space. He explained, however, that these figures could not be established as absolutely accurate, as they were based on returns from only about one-fifth of the total gross revenue represented by the companies questioned, and suggested that the committee be continued for another year in the hope of getting more complete information by that time.

Industrial Relations and Public Speaking

The first report of the newly formed industrial relations committee was next presented by its chairman, Homer E. Niesz, Commonwealth Edison Company, Chicago. The scope of the work of this committee, embracing 177 subjects under nine general heads, was outlined for a study to be carried on over a period of years, and preliminary reports covering this year's work were presented on the following subjects: "Employment," "Compensation," "Education and Training" and "Pensions." The report concluded by pointing out the advantages that would

accrue to the employees, the companies and the public from a continued study of the "problems of management pertaining to the human relations in the industry."

Injecting a little general discussion at this point, Hugh M. Blain, New Orleans, La., made the point that the key to good public relations was through accessibility of the chief executives, saying that much public relations work could be nullified by a policy on the part of executives making themselves inaccessible to the public.

W. S. Vivian, Middle West Utilities Company, Chicago, chairman of the public speaking committee, was next called upon for his report, and supplemented the printed report by the statement that although 6,000 audiences, aggregating 900,000 persons, were reached by utility talks during 1924, still this was not enough, and the companies should continue to expand this activity in the future. He told of many instances illustrating the value of this activity, and cited evidences that the work of the committee was making progress.

State Information Bureaus

The regular program of the session being completed, Mr. Sloan then turned the meeting over to Bernard J. Mullaney, Commonwealth Edison Company, Chicago, director of the Illinois Committee on Public Utility Information, for an impromptu discussion of the work of the various state committees. By way of opening the discussion Mr. Mullaney suggested that it would be appropriate to hear either from executives as to the class of work these committees were doing, or from the directors of the bureaus as to the class of material they were getting from the companies to be disseminated.

An interesting discussion was precipitated, in which the following directors of state bureaus took part: F. W. Crone, New York; B. E. Ling, Ohio, and J. B. Sheridan, Missouri. Mr. Ling introduced Miss Helen Steiner, advertising manager, Ohio Public Service Company, Lorain, Ohio, who had been active in carrying the message of the utilities to the public through speaking engagements at civic clubs and other organizations. Miss Steiner told entertainingly how easily this was done.

The standpoint of the executives toward the work of the state bureaus was expressed by Marshall E. Sampsell, Central Illinois Public Service Company, Chicago; Frank L. Blanchard, Henry L. Doherty & Company, New York; H. T. Sands, Charles H. Tenney & Company, Boston, and L. O. Ripley, Kansas Gas & Electric Company, Wichita. The discussion brought out the following salient facts: that the material sent out by the state bureaus should not be too "high brow," but should be simple facts that can be understood readily by the ordinary reader; that propaganda, in the common meaning of the word, should not be sent out, because it becomes news only when quoted from a public utterance of a speaker; that only true information should be included in the material disseminated by the bureaus, and that this should be repeated over and over.

Second Public Relations Session

Before the largest audience ever assembled at a public relations session of the N.E.L.A. a battery of speakers, chosen from the highest ranks of the country's financiers, presented a symposium entitled, "The Investor's Viewpoint," to 3,000 persons at the second session, June 17. All angles of the investment and financing phases of the public-utility business were presented by leaders of institutions representing four classes of investors, most of whom were men outside the electrical industry who had traveled across the continent for the occasion.

The first report was that of the customer-ownership committee, presented by A. Emory Wishon, San Joaquin Light & Power Corporation, Fresno, Calif. Because of the length of the program, Mr. Wishon did not read the report, but referred those interested to the printed copy of it, saying that it contained the best thought of the best minds in the industry on the subject.

The report of the committee on relations with financial institutions, presented by M. S. Sloan, chairman, told of the activities of that committee in establishing better understanding between the electrical industry and the institutions that invested in its securities. Among the more important phases of the work was that which had to do with the preparation and suggestion of legislation designed to permit savings banks to invest in public utility securities in those states where such legislation was necessary.

The Investor's Viewpoint

This concluded the association reports for the meeting, and the chairman announced the symposium in which the first speaker was Haley Fiske, president of the Metropolitan Life Insurance Company, New York City. Mr. Fiske told of the growing regard in which the insurance companies hold the securities of the light and power companies. He re-

counted instances in which the insurance companies were doing an outstanding service to the electrical industry in bringing before the public the advantages of the use of electricity, and also in disseminating information among their policyholders, telling of some of the problems of the utility companies, thereby supplementing the public relations work done by the electrical industry.

The participation in utility financing of another class of investor in public utility securities was discussed by Henry M. Robinson, president of the First National Bank, Los Angeles. From the point of view of the commercial bank, he told of the part played by this class of institutions in raising the vast sums necessary to the progress of the industry. He showed how the commercial banks were called upon to do much of the temporary financing in bringing any project to a point where enough property had been created to warrant issuance of the longer term classes of securities, and also how these institutions were called upon to help in various emergencies that arose in operation and construction.

The view of the customer-owner was expressed by B. C. Forbes, Hearst publications and the Forbes Magazine, New York, whose address followed. Mr. Forbes likened the utility operator to a tight-rope walker, hovering on the verge of a fall in two directions, attempting to satisfy the customer with lower rates and the customer-owner with higher dividends.

Presenting some figures on the growth of the customer-ownership movement, he averred that these figures reflected the growing confidence of the public in the utility business, saying that this fact charges the operators with grave responsibilities which he felt would be met.

Mr. Forbes brought out the fact that, in his opinion, central-station merchandising was imminent. In so doing he stated that he thought that it was the customer's point of view that he would rather deal with someone who would have a continuing interest



Some members of the electrical industry caught by the camera at the N.E.L.A. convention in San Francisco. Reading from left to right—Alex Dow, president, The Detroit Edison Company, Detroit, Mich.; Frank W. Smith, vice-president and general manager, The United Electric Light & Power Company, New York City; Mrs. Frank W. Smith; E. M. Herr, president, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; and Judge W. D. B. Ainey, chairman, Pennsylvania Utility Commission, and president, National Association of Utility Commissioners.

in the workability of his appliance rather than just a momentary one.

Frothingham and Mitchell Speak

The investment house was represented in the discussion by Francis E. Frothingham, vice-president of Coffin & Burr, Boston, whose address was a complete exposition of the best accepted methods of financing. He said that, when cautiously administered, the utility business offers a quality of investment second only in safety to government securities. He showed that this feeling of investment bankers has not always existed, but has come about after an eradication of evils in financing and operation which existed in the early days of the infancy of the business.

After the end of the regular program Chairman Sloan called on S. Z. Mitchell, president of the Electric Bond & Share Company, New York City, for an impromptu discussion. Mr. Mitchell pointed the way to a solution of the problem advanced by Mr. Forbes, saying that the way to get lower rates and higher dividends was first to give good service to the customer, and strive for economy of management and operation. Two ways to gain economy, he said, were by interconnection and the avoidance of unnecessary duplication of investment such as occurs when more than one company serves the same territory. The economic necessity of holding companies he explained by saying that the grouping of smaller operating companies under one head procured for the possible investor a greater security due to diversity of earnings.

At the end of Mr. Forbes' address he took occasion to announce the winner of the Forbes Magazine contest for the best record in public relations work of any public utility in the United States. The award of a handsome silver cup was made to the Alabama Power Company, Birmingham, Ala., and was accepted for the company by W. E. Mitchell, assistant general manager, who stated, in accepting the trophy, that he desired to pass on the credit for this success to the rank and file of employees who were responsible for it.

Third Public Relations Session

The third session of the Public Relations section was particularly interesting, due to the fact that the women of the industry took a prominent part in it. In a brief speech M. S. Sloan, chairman, introduced Miss R. E. McKee, Middle West Utilities Company, Chicago, as chairman of the Women's Committee, and turned the meeting over to her.

Miss McKee, reporting on the work for the year, which was the fourth of the Women's Committee's existence, stated that the committee's chief aim had been the education of utility women so that they might be capable of telling the story of the industry to the public through the channels of women's clubs, parent-teacher associations, civic bodies and similar organizations. She said that in many instances the women of the industry form the only contact with the public and that by familiarizing these women with the fundamentals of the business and showing them the importance of their relation with the con-

sumer makes for good public relations. Miss McKee stated that her committee endorsed a repetition of last year's program. She then introduced Miss Sophia Malicki, also of the Middle West Utilities Company.

Miss Malicki dwelt on the importance of the establishment of local women's committees. She stated that some companies were not willing to allow the organization of such committees and that such companies evidently did not realize the importance of the contact between the women of the industry and the women of the community; that the utility women could help raise the community standard of living, and that through representation in women's clubs they could spread the utility message. Miss Malicki concluded by saying that the Women's Committee stands ready to help the light and power industry.

The chairman of the Women's Committee of the Great Lakes Division, Mrs. P. W. Evans, Interstate Public Service Company, Indianapolis, Ind., was the next speaker. She stated that a total of approximately 3,000 women employees of utilities in the states of Michigan, Wisconsin, Illinois and Indiana had attended meetings of the committee. Some of the activities carried on by the committee covered speeches to women's clubs, parent-teacher associations, and similar organizations, participation in safety campaigns, personal service work among women employees, weekly bulletins containing present-day information, contests to enlist the interest of women, the formation of classes in better English and public speaking. Mrs. Evans stated that when new properties were acquired the Women's Committee was of material benefit in acquainting new employees with the work. The following topics have been chosen by the committee for study and discussion: holding companies, superpower, customer-ownership, highway lighting and rural lighting. Mrs. Evans closed her remarks by stating that "the strength of the Women's Committee lies in service to our customers and in service to our companies."

Miss Ruth Morris of the Georgia Railway & Power Company, Atlanta, Ga., the next speaker, said that, as the majority of the women employees of her section were comparatively young, elementary courses in subjects were necessary; that classes in public speaking had been formed, essay contests had been conducted, and principles of the utility business were being studied.

The chairman of the Southwestern Division, Mrs. Bess Brooks, Oklahoma Gas & Electric Company, Oklahoma City, said that there are 545 women in that division, 88 of whom are Class A members of the N.E.L.A., and that 35 committees had been formed. Special attention has been given to public speaking, first-aid methods and securities selling. Mrs. Brooks stated monthly meetings were held, with interesting programs, including discussions by department heads; that essay contests, lectures, demonstrations and speeches before schools, civic bodies and small social gatherings were used to spread the utility message, and that she felt the outstanding accomplishment of the organization was proving the power of the spoken word.

Mrs. John D. Sherman, president, General Federation of Women's Clubs, Washington, D. C., stressed the importance of home-making and the vast potential power inherent in a combination of that organization with the National Electric Light Association when directed toward the raising of the standard of the American home. She emphasized the great opportunity before the light and power industry and its proportionate responsibility. Mrs. Sherman said that the federation's first step in the work was the starting of a nation-wide survey of home-making methods and facilities prevailing in the homes in the United States. This survey is being conducted as far as possible through the agency of and through contact with the public utilities officials, whose cooperation has been sought as a means of arousing the women of the nation to a renewed appreciation of the vital importance of public utilities to the business of domestic efficiency. Mrs. Sherman also stated that a further purpose of the survey is to convince Congress that the decennial population census should give periodically the salient facts about the equipment of the American home with the essentials of the efficient conduct of the business of home-making, and that if this should be accomplished the information would be available to public utilities officials "in the continued adaption of public utilities functions to American home demands." Mrs. Sherman concluded her remarks with the following significant statement: "Home-making in the United States today is the greatest industry in the world—and its improvement is a challenge to Uncle Sam and to such groups as are represented in the National Electric Light Association and the General Federation of Women's Clubs."

The next speaker, Miss Isabell Davie, chairman Women's Committee, Middle West Division, urged that in the future particular attention be devoted to the development of women speakers, saying that properly selected and carefully trained girls could be made just as effective as, or more effective than, men speakers before certain bodies, such as school audiences, women's clubs, mixed meetings and sometimes businessmen's associations. She stated that no industry in the world has a more inspiring message than the electric light and power industry—the message of service—and that by developing natural, simple and sincere speakers with pleasing personalities this message can be carried to the general public. In the discussion that followed, Miss Gertrude Thibodeau of the Malden Electric Company, Malden, Mass., Miss M. S. Fletemeyer of the Northern Indiana Gas & Electric Company, Hammond, Ind., and Miss Elizabeth Lee of the Alabama Power Company, Birmingham, Ala., stressed this note of service and told what the women in their sections were doing to carry the utility message.

"The Better Half of the Industry" was the subject presented by Mrs. L. A. McArthur, wife of the vice-president and general manager of the Pacific Power & Light Company, Portland, Ore. The speaker dwelt on what women may do in the future in conjunction with the men of the industry and suggested that the qualities that make women good housekeepers fit them to help in industrial housekeeping. Mrs. Mc-

Arthur pointed out that feminine tact, patience and perseverance are qualities that could be used to good advantage in the electrical industry, and stressed the amount of good that the women of the industry can do toward helping win the public away from the idea of political ownership and "convert it to an unswerving loyalty to the initiative, energy and vision which have been one of the foremost civilizing factors in our national life."

Miss Helen Steiner, of The Ohio Public Service Company, Lorain, Ohio., Miss Frances Emans, of the Southern California Edison Company, Los Angeles, Calif., and Miss Helen Norris, of the Commonwealth Edison Company, Chicago, Ill., took part in the discussion which followed, emphasizing the fact that women are a factor in the industry and that the women who have come into it through marriage are interested in the work of their husbands and are an especially advantageous channel through which to tell the industry's story of service.

This concluded the women's share in the program, and Miss McKee turned the meeting over to Mr. Sloan. After a short complimentary speech on the work of the women, he stated that the report of the nominating committee had been made at the previous meeting and then introduced Henry Swift Ives, vice-president, Casualty Information Clearing House, Chicago, whose subject was, "Protecting the Right to Own." Mr. Ives brought out the fact that public utilities and public service corporations constantly are being attacked through the right to own and that in protecting themselves they are protecting all property owners. He stated that the chief menace of the right to own is the government-ownership movement, emphasized the lack of cooperation between the industries most in jeopardy, and added that already there has been a large measure of cooperation along educational lines between the electrical industry and the casualty insurance business. He suggested that a Private Ownership League which would unite all property owners might be a feasible method by which to protect the right to own.

Discussion on "The Public Be—Told" was participated in by Harry Reid, of the Interstate Public Service Company, Indianapolis, Ind., and chairman, Indiana Committee on Public Utility Information, who said that not only the advertising department but every department in the organization must take part in the job of instilling a lively interest in the general problem of educating the public; by Bernard J. Mullaney, of the Commonwealth Edison Company, Chicago, and director Illinois Committee on Public Utility Information, who made the point that the fight to protect the right to own will not be made successfully nor won quickly unless those in contact with it bring home to all the other property owners the fact that it is also their fight and that the only way to do that is to tell the people; and by Miss Julia Paillet, of the New Orleans Public Service, Inc., New Orleans, who contrasted the old era of antagonism between the public and business with the present regime in which industry, with service as its motto, strives to help the public. She stated that good public relations could be attained by giving the public a square deal and letting them know they were

getting it, and outlined some of the ways in which women were helping do this.

COMMERCIAL SESSIONS

No such enthusiasm has been seen in the Commercial Section for many years as was witnessed during the three sessions held by this section during this convention.



W. R. PUTNAM
Chairman, Commercial Section

There has been a stirring of the spirit this year that is putting heart into the commercial men after a long period of apathy, and it was crystallized into voice and action in San Francisco when the subject of merchandising came before the Association. That a new era of commercial activity had dawned and new opportunities in the cooking, refrigeration, lighting and transportation fields were being

unfolded was the opinion of a dozen or more old-timers of the commercial branch of the industry who rose to pay tribute to the work of a number of the committees reporting this year.

First Commercial Session

The first session called to order by the section chairman, W. R. Putnam, Idaho Power Company, Boise, was the largest commercial meeting within the memory of the members, and the most encouraging and inspiring. The reports of the electric cooking and heating committee and the appliance committee were presented, and a stirring keynote speech on merchandising electrical appliances was delivered by Edward N. Hurley, chairman of the board of directors of the Hurley Machine Company, Chicago.

The opening address of the chairman, W. R. Putnam, was very brief, devoted principally to pointing out the good progress that has been made this year in increasing the interest of the geographic sections in active work co-ordinated with the national program, and appealing for a further expansion of the geographic committee work.

The program of the industrial lighting committee, representing central stations, manufacturers, jobbers, contractor-dealers and other interests concerned with the development of better illumination, the conservation of eyesight, etc., was outlined by Joseph F. Becker, United Electric Light & Power Company, chairman, who discussed in detail the plans for the national advertising of this industrial lighting campaign, which is to begin on Sept. 1 of this year. One hundred thousand dollars has been established as a fund for the promotion of this campaign, with the alluring prospect of \$45,000,000 additional revenue possible of development in this field.

Range Survey in Northwest

The status of the range survey which is being conducted in the Northwest was described by A. C. McMicken, Portland Electric Power Company, chair-

man of the electric cooking and heating committee. Owing to difficulties encountered in developing the necessary instruments for recording the tests, it is only possible to record the progress of this field survey which is being conducted by 150 ranges in Spokane, Wash., and 150 ranges in rural territory near Boise, Idaho. The objective of this study is to develop facts on range and water-heater loads, to determine adequate rates for this class of business, to develop experience with metering water heaters and in the servicing of ranges and water heaters. Charts showing the character of range load under investigation were presented by Lewis A. Lewis, Washington Water Power Company, chairman of the Northwestern geographic section committee.

George Hughes, Edison Electric Appliance Company, Inc., and Merrill Morrow, Westinghouse Electric & Manufacturing Company, representing the range manufacturers who have financed this survey in large part, expressed their satisfaction and enthusiasm on the work that the committee is doing. Discussion brought out the fact that the average consumption per electrical range is 490 kw-hr. per month as against 400 kw-hr. for light and other appliances. The average consumption for a manually operated water heater is 210 kw-hr. and 800 kw-hr. for an automatic water heater. Mr. Lewis stated that the range load in Spokane is worth today \$500,000 in actual annual revenue.

Hurley Addresses Meeting

Opening with the statement that the study of merchandising is the greatest commercial and economic problem before the people of the United States today, E. N. Hurley made a strong appeal for consideration of the sales problem of the central station industry. At the present time, he said \$2,000,000,000 worth of merchandise is constantly in transit in freight cars in the United States. Owing to the improvement in efficiency of the railroads this is 20 per cent less than the investment which was tied up in this process of distribution five years ago. If here such practical economic benefits can be credited to improved methods of distribution, the same efficiency must be developed in the electrical industry through cooperation between the manufacturers and their customers.

At the present time \$350,000,000 is invested in the manufacture of electrical appliances. The securities of these manufacturers, no less than those of the utility companies, are owned by the public and are an element in public relations of the industry. A satisfied user of electric light, he said, is doubly satisfied by the use of appliances also, and the merchandising of appliances gives the greatest opportunity for improving public relations within the reach of the central station industry today aside from any consideration of its revenue value. Forty-nine of the central stations now sell merchandise. If the other 51 per cent also assume leadership in the sale of appliances a great stimulus will be brought to the electrical industry.

Appliance Committee Report

The report of the appliance committee was presented as a combined address and demonstration, the

purpose being to show the value of appliance load and to indicate the fundamentals of sales policy in practice. Strong intent of purpose is the first essential of a sales campaign, said Thos. W. Berger, Philadelphia Electric Company, chairman, and appliance selling is not keeping pace with the growth of the industry because central station organizations are not thoroughly sold on the merits of appliances as a load and as merchandise. To determine in actual practice the influence of appliance load on residence income a detailed survey has been made this year in the city of Cincinnati by the study of 100 accounts of minimum or small-bill customers whose bills had suddenly increased. T. L. Phillips, of Cincinnati, vice-chairman, presented the findings in a series of extremely interesting charts and a dramatic demonstration of the logic of developing domestic appliance business that won tumultuous applause and a rising vote of thanks.

Having presented the logic of this appliance business, Mr. Berger, in an inspiring address, outlined methods by which the business may be secured, analyzing the function of advertising in this field, stressing the fact that results cannot be achieved through the maintenance of traditional dignity in advertising. There is no dignity in the sale of an appliance of a vacuum cleaner for \$1 down, he said, yet it is a very human transaction, and the salesman must talk the simple language of the people in developing this market.

John F. Gilchrist, Chicago, in the general discussion which followed, pointed out the benefit that comes with increased domestic appliance loads in the improvement of load factor.

Earl E. Whitehorne, New York, appealed for a broader purpose in appliance selling that would set up a practical program for complete equipment of the home. The key to the situation, he said, will be to guide the public to recognize that the larger electrical equipment may be purchased when the house is built and financed through the mortgage, and that the auxiliary smaller equipment can be financed through a regular program of budget appropriation that will acquire these appliances in sensible sequence.

W. R. Putnam, chairman, indorsing this suggestion, cited a recent study of 750 homes, the purpose being to determine to what extent appliances were installed. It was found that these homes were equipped only to the extent of thirty per cent. He estimated that at the present rate of progress it will take thirty years to equip fully the homes on existing lines throughout the country. Yet the development of this opportunity offers not less than five billion dollars in sales to the electrical industry of the United States.

Second Commercial Session

Electrical refrigeration occupied the center of the stage in the second session of the Commercial Section, the afternoon of June 17. Attendance was not as large as at the opening session, owing to the competition of a very popular program in the main auditorium under the auspices of the Public Relations Section. The subject of refrigeration, however, is

probably the liveliest issue before the central station commercial man today, and the presentation of the committee's report was followed with keenest interest. A. T. Waterfall, vice-president of the Dodge Motor Car Company, of Detroit, addressed the meeting and told what the large power user thinks of the central station.

The session opened with a report of the customer relations committee presented by F. F. Kellogg, Duquesne Light Company, Pittsburgh. The report reviewed the purpose of the customer relations committee and the work they have done to bring home through the employees of the industry, the importance of the contact made with the users of electric service. In the course of this work a series of customer relations suggestions has been published, about one a month, to inform the members of the methods and experience of progressive companies.

E. W. Lloyd, Commonwealth Edison Company, Chicago, in the discussion stressed the importance of attention to the appearance of the men who represent the company. M. R. Griffith, Boston, pointed out that the chief contact between the employees and the public involves employees who receive the least training in their attitude toward the public. It is easy enough, he said, to tell the employee to be polite and to keep himself clean, but this means one thing to the repair man and another thing to the counter clerk. Instructions therefore should be made exceedingly specific.

Refrigeration Report

George E. Miller, Electric Illuminating Company, Cleveland, presented briefly the report of the refrigeration committee, outlining the scope of the investigation which has been made. He gave particular emphasis to the fact that a central station cannot afford to experiment in refrigeration, but should make its selection of a machine on the basis of known facts; also, that the light and power industry is concerned vitally that the manufacturers of electrical machinery should prosper and build up refrigeration on a firm economic basis.

Chairmen of subcommittees who were present reviewed the work of their part of the study which the committee has made, embracing a survey of the equipment on the market, active engineering tests of the principal refrigerators now in production, the experience of a large number of installations throughout the country, and a review of the commercial methods employed in the development of the refrigeration market.

Angus McLay, Detroit, stated that the average cost of ice in 42 cities is 60 cents and that the cost of ice in a test refrigerator was \$84, as compared with \$64 for the same ice box equipped with an electrical refrigerating unit.

Manufacturers Heard From

G. M. Dwelley, Kelvinator Company, Detroit, congratulated the committee on its work and said that the manufacture of electrical refrigerators this year will pass the total sales of electrical ranges. He estimates that there will be 75,000 domestic refrigerators sold this year and 25,000 ice cream cabinets.

This means \$500,000 added to the central station revenue this year, and a total of \$3,000,000 annual revenue on all refrigerators so far sold.

G. E. Durban, Frigidaire Corporation, Dayton, said that we have reached the time when it is no longer necessary for manufacturers to sell the idea of the value of the load to the central station industry. The manufacturer now is concerned chiefly in finding out how he may best cooperate with the utility man.

H. G. Seaver, Servel Corporation, New York, said that there is no question but what 10,000,000 refrigerators will be sold in America during the next ten years. The speed with which this market is developed depends largely on how much support the refrigeration industry receives during the pioneering period.

J. R. Lovejoy, General Electric Company, Schenectady, told of a number of recent luncheon meetings at which Charles R. Coffin had gathered together prominent men of the central-station industry to discuss the value of the electrical refrigerator to the stockholders of the central stations. The electrical refrigerator is bringing a new era in the development of electricity in the home, and it comes in good time to assist the public utility that meets the high cost of service under present conditions.

Report of Power Committee

In presenting the report of the power committee, V. M. F. Tallman, Boston, threw on the screen a chart showing the comparative activities in different sections of the country that are being directed toward the power research. In the east central geographic division, the Pacific Coast division and in New England, far greater attention is being given the power field than elsewhere in the country. This, he says, is the result of active leadership locally. He appealed for the service of more young men in this branch of the business.

A. T. Waterfall, vice-president of the Dodge Motor Car Company, Detroit, told of the experience of that company with central-station service. The Dodge company consumes two million dollars' worth of electric power annually, having 12,000 hp. in motors installed. This company formerly operated its own plant, then came an accident and they realized the advantages of the resources offered by dependable central-station service. The central-station industry, he said, is relatively where the automobile industry was when it was manufacturing cars that had to be cranked by hand. It went through all the grief in the development of the self-starter which this industry must face in working out the problem of electrical refrigeration and electrical industrial heating. The American public is very intelligent, however. When they find out what electrical refrigeration and industrial electric heat is or how electrical refrigeration and industrial electric heat can benefit them, the market will develop rapidly.

Third Commercial Session

Several fields for building load, particularly off-peak load, were surveyed in the third session of the Commercial Section, June 18. Reports covering electric truck transportation, street and highway light-

ing, residence lighting and lighting campaigns, and discussions on these subjects were received with enthusiasm by the delegates, while a discussion on ways and means of increasing attendance at Commercial Section sessions furnished an entertaining interlude not on the program.

The first report to be presented was that of the transportation committee, by its chairman, B. J. Martin, Commonwealth Edison Company, Chicago, who told of the possibilities in building load for utilities through promoting the use of electric trucks. He pointed out that the charging current for truck batteries was used through the night, thus helping to fill the early-morning valley. Selling the electric transportation to the industry, he said, should receive consideration of all commercial men.

In commenting on the work done by the geographic division committees, Mr. Martin especially commended the work of the Pacific Coast Electrical Association. He introduced J. S. Moulton, San Joaquin Light & Power Corporation, chairman of that committee, who told of the survey of the possibilities of the field conducted in California, and explained the methods of conducting the two truck schools. Representatives of the manufacturers of electric trucks, in discussing this report, commended the work done by the national committee, making the point that the essential element in selling electric truck transportation was to survey the field to see where electric trucks could best fit into the picture, and then concentrate on that territory.

Discussion on Attendance at Sessions

The small attendance at commercial sessions was decried by E. W. Lloyd, Commonwealth Edison Company, Chicago, when he was called upon as chairman of the nominating committee to offer the names of fifteen section members from which to choose the section chairman and executive committee. Mr. Lloyd invited discussion to see if the reasons for this small attendance could be discovered and if a remedy could be found. Such discussion developed that the holding of parallel sessions with the Public Relations sessions was the principal reason, since many commercial men also were much interested in public relations. It was suggested that the next year's executive committee of the Commercial Section take steps to remedy this situation by a rearrangement of the general convention program so that these two important sections with so much in common be not required to hold their meetings at the same time.

Street and Highway Lighting

The report of the street and highway lighting committee, presented by its chairman, E. W. Lloyd, pointed out among other things the opportunity for central stations to increase revenue by more intensive development of the street lighting business. It called attention to the fact that a 400-cp. lamp would consume approximately 800 kw-hr. per annum, which at 3c per kw-hr. would produce \$24 gross revenue, or a revenue equal to the average obtained from a small residential customer.

Relations with civic authorities and with groups

of citizens, and methods of financing street lighting improvements, were among the more important subjects discussed by the report, while a model plan for a typical city was presented in detail, as a part of the report by the Public Service Company of Northern Illinois.

"The question of highway lighting is receiving attention in the more congested areas of the country and still it is practically a virgin field," said the report in considering this newer application of lighting energy. It was pointed out that the transportation of freight on the highways at night was one of the reasons for the development of highway lighting.

In discussing the report, L. A. S. Wood, Westinghouse Electric & Manufacturing Company, South Bend, Ind., recommended that cities be required to help finance investment in street-lighting equipment, through bond issues or otherwise, so as to relieve the central-station rate for lighting of the burden of providing the carrying charges on this investment, thus keeping the street-lighting rate down. This would make it possible for municipalities to buy more lighting from their budgets.

Lighting Committee Presents Reports

The lighting committee, under C. C. Munroe, Detroit Edison Company, Detroit, chairman, was active during the year in preparing reports on various phases of the lighting business. The general report, as outlined by its chairman, summarizes the reports on the more specific subjects and presents a plan for the organization of illuminating engineering departments in central stations.

The residence lighting report was presented by its chairman, M. Luckiesh, National Lamp Works of General Electric Company, Cleveland, Ohio, whose keen humor drove home his points with stinging and lasting effect. With the data available from the primers returned in the Home Lighting Contest it was possible to expand the survey begun three years ago and to discover what is an average home. From these data a conservative ideal home was established and a conclusion reached as to what revenue might be available if all homes in the country not now equal in lighting facilities were brought up to the standard set in this conservative ideal. The astounding total in revenue at 10c per kw-hr. reached \$875,000,000.

P. B. Zimmerman, National Lamp Works of General Electric Company, Cleveland, Ohio, next presented the report on lighting campaigns. In this report all the possible campaigns in the lighting field were discussed with some of the inherent difficulties in campaigns brought out from recording the reactions of central stations which had engaged in these campaigns. Mention was made of the new utility light for the home, a combination of metal reflector and opal glass shade with a plug and loop so that it may be suspended in any part of the room. Campaigns on this unit have been tried in Cleveland and seem to promise good results when the details have been worked out.

At the completion of the regular program, Clark Baker, National Mazda Sales Division of General Electric Company, Oakland, Calif., was called upon

to tell of the lighting schools conducted in California last year. With the aid of slides he showed the scope and application of the two schools conducted, and brought out that these schools were primarily for contractors' estimators and jobbers' salesmen. He said that only the most elementary phases of illumination were taught and that those attending had been loud in their praise of the general idea of the schools, namely, to put information into the hands of these important links in the chain leading from design to completion of a lighting job so that better and more complete jobs would be turned out.

During the third commercial session, Miss Julia Groo, winner of the National Home Lighting Contest, was introduced and spoke briefly, outlining the progress of artificial lighting and stressing the necessity of educating homemakers to the possibilities of more decorative and utilitarian lighting.

TECHNICAL SESSIONS

Nationally speaking, the progress made during the past year in matters technical is noteworthy, and due credit must be given to H. P. Liversidge, of the



H. P. LIVERSIDGE
Chairman, Technical Section

Philadelphia Electric Company, and his staff, of which Western men have been a well recognized part. The willingness of the Western section to assume its full share of the burdens of the national section has had a wide influence toward the decentralization of Technical Section activities. The work performed during the past year will represent a substantial monetary saving to the various power

companies which participated in the work of sending delegates to the national meeting in Cleveland and in St. Louis. Greater efficiencies in design and in operation will be noted as a result of the year's activities. Greater cooperation on the part of the manufacturers toward the simplification and the standardization of electrical apparatus has been effected, and the greatest obstacle in the pathway of this worthy aim now is the inertia of certain power companies and their officials who highly overestimate the minor and short-lived inconveniences that might in certain cases come of rigid standardization.

First Technical Session

Technical men to the number of 500 or 600 from all over the country featured the opening meeting of the technical sessions. H. P. Liversidge, of the Philadelphia Electric Company, national chairman, opened the meeting with a brief address in which he touched upon the work of the section and the necessity of full cooperation between all geographical divisions if the greatest possible benefit is to be derived. Appreciation of the splendid support and cooperation of these divisions during the past year was expressed. The chairman stressed the vital importance of the economic aspects of all engineering

considerations. The outlook for the coming year is interesting and much good work is scheduled to be done.

Accident prevention activities slowly are coming into the recognition which they so well merit. The twelfth annual report covering these activities was submitted by the national chairman and showed the progress being made. The fact that accident prevention is clearly an essential factor in public relations was stressed. The committee has made a detailed study built around each of the several main and outstanding central station activities in order that its findings and recommendations might be applied more readily and directly. The committee recommends, among other things, that current accident reports of operating companies frequently be scrutinized in order to determine the cause and responsibility for the accidents which occur. Violation of common safety rules by new employees make it at once apparent that the education of this class of employees is of the most importance.

Highlights covering the activities of the electrical apparatus committee were reviewed briefly. Serial reports dealing with certain specific problems are in the course of preparation and others are under consideration. Generating stations, a.c. substations, d.c. substations, transformers, motors, oil-circuit breakers and protective equipment, foreign practice, hazards and safety, power factor improvement, system connection schemes, operating methods and routine and facilities, and specifications are the subjects covered during the past year.

Full cooperation with the geographic divisions has been the central theme of the hydraulic power committee in carrying out its work for the past year. Serial reports have reduced materially the congestion heretofore experienced in the abandoned practice of printing all reports as convention reports. Results of the year's work are very encouraging. Efforts are being made to obtain foreign manufacturing and operating information for the benefit of section members. Work of this committee has been restricted somewhat due to the fact that practically all work had to be carried on by correspondence, the members being so far apart. Only two meetings, the St. Louis and the Cleveland meetings, could be taken advantage of by the committee as a whole.

Interim reports on "Allocation of Costs," "Interference with Reception of Radio Broadcast Programs," and "Noise Measurement with Noise-Measuring Set" have been prepared by the inductive coordination committee. None of these reports have been published as yet, but have been submitted to the national technical executive committee for approval.

The eighteenth year of meter committee work has come to a close and finds twenty-two standing subcommittees actively engaged in the work of the committee. Seven serial reports are in the course of preparation. More than eleven thousand copies of the metermen's handbook have been sold. Twenty-five or more metermen's instruction courses are contemplated for the year. Great strides have been accomplished toward the much-desired standardization,

and due thanks are given by the chairman to all who participated so liberally.

Distillation products of coal, fuel, specifications, cooperation with other engineering societies, and broad-scope problems are the subjects which have engaged the prime movers' committee for the year just closed.

One of those to go through the greatest change in organization during the past year is the overhead systems committee, which heretofore had its many subcommittees under the chairmanship of members-at-large and now divides them between these members and the various geographical division committees of the same name. Many different problems ranging from electrical problems of distribution and 220-kv. transmissions to tree-trimming and transformer loadings have been dealt with. Unfinished work in general and study pertaining to standardization of insulator threads for 1 $\frac{3}{8}$ -in. pins and to specifications for distribution transformers and lightning arresters are bequeathed to the incoming committee for the next year's work.

Cables for transmission of power at voltages in keeping with the demands of the industry were the outstanding subject under consideration by the underground systems committee. This subject is quite likely to engage the full energies of the committee for some time to come as it is undoubtedly of inestimable importance to the industry. Many different detailed investigations into problems of operation, maintenance and installation of cables have been made. Sincere and hearty cooperation of all geographic divisions is recognized.

Second Technical Session

Whether the much-wanted and widely discussed age of water power has not come about quietly and unobtrusively while plans for it have been talked about, was the question raised by H. A. Barre, Southern California Edison Company, in addressing the Technical Section.

Mr. Barre gave some intensely interesting information concerning "Some Factors Affecting the Relations of Steam and Water Power in Combined Systems." Whether additional generating capacity shall be provided by the construction of steam or of hydro plants is decided only after careful study of past conditions and forecast of future demands. When power is needed urgently no particular thought is given to the cost of development, the most important thing being to get the power in the quickest way. However, for all normal times, the economic aspects are of prime importance.

A company undergoing the rapid growth experienced by California utilities in particular is confronted with many unusual responsibilities. To be in a position to supply power when and where the demand may arise necessitates extremely careful studies and forecasts covering at least tentative building programs as far as ten years in advance. Steam serves particularly well for the load-building period, during which hydroelectric capacity is being developed to care for that load. The combined system must be designed to care economically for fluctuating

tuating fuel costs and fluctuating hydro conditions where water available in any year may vary from a minimum of 54 per cent of normal to 125 per cent of normal.

Impulse-Wheel Design

Latest developments in impulse-wheel design were completely discussed by E. C. Hutchinson, Pelton Water Wheel Company, who pointed out the fact that California is second only to New York in point of total hydro development. The eleven western states contain 71 per cent of the total potential hydroelectric power in the United States.

Mr. Hutchinson went over the latest details of design of this class of equipment, familiarizing the delegates with the type of equipment typical of the West. In pointing out some of the engineering problems involved in the handling of the immense units of power incidental to high head developments, it was stated that the power that must be absorbed in suitable baffles when a unit is suddenly shut down at a certain plant, is 20,000 hp. from a stream of water of less than 7-in. diameter. Western hydroelectric generators are of smaller physical dimensions than their Eastern relatives, but they operate at a much higher velocity and have much finer clearances. The use of rubber seal rings is becoming more successful with each successive installation and much is hoped for the future along this line.

Co-ordinated Service

Deploing the decision of a certain public utilities commission, which did not grant permission to an electric service company to erect its transmission lines along a certain eight miles of improved highway, forcing it to go to a less frequented road, thereby reducing the possible utility of the lines to the local community, Carl Jackson, N.E.L.A. attorney, urged cooperative efforts toward the solution of the interference problem. Rural development in particu-

lar and the public good in general are greatly jeopardized by the legal squabbling between the communication and the power interests over priority of right-of-way and other allied questions.

Dual occupation of the same highway is thoroughly practical and a vital necessity in many cases. Each company must take the steps necessary to safeguard its own service and at the same time to protect its neighbor, said Mr. Jackson. The joint committee of the N.E.L.A. and the Bell Telephone Company is working along the lines of maximum public service in the most economical way and hopes to effect complete co-ordination between the interests involved. The work of the California Railroad Commission in effecting a complete cooperative solution of the entire problem is commended highly.

New Director of Engineering

Col. William Kelly, new director of engineering for the N.E.L.A., asserted that his job was not primarily that of an engineering authority or specialist, but that his biggest task was to co-ordinate the efforts and activities of some 500 committees and subcommittees. Stating that the inertia of his new task is high, Col. Kelly made a plea of tolerance and cooperation.

Col. Kelly further stated that if the engineering problems of the industry were to be settled to the satisfaction of the industry, they must be settled by the engineers of the industry. He offered himself and his office to the aggressive furtherance of this work.

Third Technical Session

In commenting upon "The Spirit which Permeates the Service of Our Utilities," H. Birchard Taylor, vice-president of William Cramp & Sons Ship & Engine Building Company of Philadelphia, stated that a cultural education of the rising generation is no longer sufficient. Explaining that "cultural" popu-



The N.E.L.A. convention brought to San Francisco many men whose names are well known to the electrical fraternity. Among them, shown here in characteristic attitudes, were (left to right)—H. G. Seaver, president, Servel Corporation, New York City; H. H. Rudd, vice-president Railway & Industrial Engineering Company, Greensburg, Pa.; John F. Gilchrist, vice-president, Commonwealth Edison Company, Chicago, Ill.; Carl E. Jackson, attorney, N.E.L.A.; and S. Z. Michell, president Electric Bond & Share Company, New York City.

larly is taken to pertain to subjects no longer constructively alive and active, he went on to say that a revision of studies to include as requisites and fundamental sciences, business practices, fundamental economics and other allied subjects would be of inestimably more value and actual use in later life to the average student than would an accurate conjugation of some forgotten Latin verb. The present-day development is entirely too rapid to be adequately picked up and understood by the student when treated as a side line as it too frequently is. A more logical viewpoint and far sounder thinking in terms of present-day problems would result and would react to the benefit of individual and nation alike. An interest in subjects generally taken entirely for granted and which vitally enter into the life of everyone would be engendered by a study of simple and fundamental science on a more general plane than now in vogue.

Free interchange of information among those engaged in the light and power business must be unrestricted and unopposed if the greatest and most economical advances are to be made in the industry, according to Mr. Taylor, who deplores the continuance of the ancient idea that valuable information was to be regarded as a secret among a few. With the possible exception of a fractional percentage of items relating to certain manufacturing processes, Mr. Taylor admits no possible reason for the hoarding of information. The spread of information and the wide discussion of operating difficulties makes possible the most efficient and logical use of apparatus and ideas.

Just as a purely general education forestalls and prevents a proper and popular understanding of common engineering problems and difficulties, so does a lack of design and manufacturing problems and difficulties on the part of the electrical utilities prevent their proper understanding and consideration of these items in the design and operation of their systems. Mr. Taylor lays the fault at the door of the manufacturers and the competitive system as it now exists and has existed.

Status of Engineer

"The Status of the Engineer" was discussed by R. F. Pack, vice-president of the N.E.L.A., who stated that his remarks were from observation and not from engineering experience. The works of the engineer are everywhere and every day at hand, and hence the engineer need only to give consideration and study to problems of civic and community necessity along lines other than technical to achieve the recognition which is deserved. In pointing to eminent executives who are engineers, Mr. Pack emphasized the fact that the old engineering attitude that engineers had no interest in the economic features of development projects was and is nothing short of suicidal for the engineer as far his chances for advancement to executive positions is concerned. The engineer has a place in commercial activities, managerial problems, civic and political problems and other allied subjects, if only he will awake to the fact. Mr. Pack believes that more and more is the

engineering profession being looked to in the hunt for capable executives.

Engineer in Human Affairs

Prof. William F. Durand, Stanford University, president of the American Society of Mechanical Engineers, also believes that the engineer has a very definite place in the sun of human affairs. Prof. Durand pictured the engineer as the guardian of all natural resources and charged him with the development of these to the end that the greatest good possible should come to the greatest number of people. The present stage of development in human affairs has come about through the harnessing of natural resources in a way which makes their energies available to mankind. Without power, Prof. Durand sees the present age as nothing more than another Roman, Greek or Egyptian age, and regardless of the glories and achievements of those ages they would not satisfy the needs of the present.

No profession has a more ancient lineage nor a greater right to be proud and to assert itself in the everyday affairs of man than has the engineering profession, the works of which have stood out since history began to be recorded, and probably before. Like Mr. Pack, Prof. Durand sees in the medieval ideas of secretiveness the stifling of progress and the loss to the world, of the future at least, of many valuable works and developments.

As custodian of all of the natural resources of the world Prof. Durand asserts that the engineer must study all of the significant factors of the present business and economic world, place a correct valuation upon each of these factors, study the reaction and action between each of the factors, and from all of these draw his conclusions. Engineering methods should be applied more liberally and generally to public problems, and no one is more the one to do this than is the engineer if only he will realize the present necessity and act in accordance with that necessity.

ACCOUNTING SESSIONS

First Accounting Session

The first session of the Accounting National Section was held June 16, at 2:30 p.m. The session was presided over by the chairman, W. Paxton Little, treasurer, of the Niagara Falls Power Company, Niagara Falls, N. Y.



W. PAXTON LITTLE
Chairman, Accounting Section

As his report on the general activities of the Accounting National Section was presented to the convention at the general session held in the morning, he did not repeat it. He stated that a great deal had been accomplished during the year just closing and that a foundation had been laid for greater achievements by their successors. Mr. Little stated that the reports of the various subcommittees had been printed and

distributed well in advance of the meeting, so would assume that they had been read and digested by those present. He accordingly instructed the chairmen to present only the salient features of their reports so that time might be allowed for discussion.

Committee Reports

The report of the budget committee was presented by Robert B. Grove, chairman, the United Electric Light & Power Company, New York City. The report consisted of a symposium of current budget practices of fifteen member companies.

In the absence of W. J. Meyers, chairman of the committee on classification of accounts and annual reports, this report was presented by Frank W. Smith, former president of the Association.

In the absence of W. H. Cassell, chairman of the committee on customers' records and billing methods, this report was dispensed with and accepted as printed.

Franklyn Heydecke, Public Service Electric & Gas Company, Newark, N. J., chairman of the filing and preservation of records committee, presented the report of that committee.

J. A. Rockwood, Portland Electric Power Company, Portland, Ore., presented the report of the fixed capital records committee in the absence of G. U. Stewart, chairman.

The report of the payroll standardization committee was presented by W. J. Vega, the New York Edison Company, New York City, chairman.

Fred W. Herbert, National Electric Light Association, presented the report of the purchasing and storeroom accounting committee, in the absence of K. C. Campbell, chairman.

The report of the securities accounting committee was given by T. A. Wallace, Henry L. Doherty & Company, New York City, chairman.

Following these reports general discussion was invited by those present. The chairman also called on a number of men from various parts of the country for an expression of their opinions.

Second Accounting Session

The second session of the Accounting National Section was held Wednesday. It was well attended and those present had the pleasure of listening to a very interesting program. The chairman, W. Paxton Little, treasurer of the Niagara Falls Power Company, Niagara Falls, N. Y., presided.

Multiple Taxation

The first address of the day was presented by Charles C. Staehling, associate professor accounting, department of economics, University of California, Berkeley, Calif., on the subject of multiple taxation. In summarizing his address Mr. Staehling stated that tax procedure should be revised wherever necessary to avoid double taxation and to use as a basis of assessment a fair measure of the ability to pay; this is generally considered to be net income. All taxation in a class should be treated with uniformity and equality. The principle of uniformity and equality in the application of ability to pay should be extended to the federal tax procedure.

Accountant Indispensable

P. S. Arkwright, vice-president of the National Electric Light Association, Atlanta, Ga., followed Mr. Staehling. He stated in his own organization he had made a detailed study of every department of the business, and while each one was essential, he had come to the conclusion that the accounting department was the most important and essential one. Although this department is seldom in the limelight, it is fundamental in the business.

Section Relationships

The relation of the Public Relations Section with that of the Accounting Section was told by M. S. Sloan, chairman of the Public Relations National Section, N.E.L.A., Brooklyn, N. Y. He stated that the accountants must create and maintain public good will by decreasing the amount of red tape in the operation of the companies and maintain it by eliminating any errors in billing customers.

W. R. Putnam, chairman of the Commercial National Section, N.E.L.A., Boise, Idaho, told of the relationship which should exist between the Commercial Section and the Accounting Section. He stated one of the largest problems facing the utilities today was that of selling five billion dollars' worth of appliances so the homes in the United States would be properly applaned. Mr. Putnam said the Accounting Section could perform a great service in working out ways and means of financing the companies or other agencies to sell these appliances and also in evolving a plan of handling the deferred payments on them. He urged the cooperation of the accounting departments with the commercial men who do not understand the problem of the accountant.

In addressing the meeting on the relationship of the engineer and the accountant, H. P. Liversidge, chairman of the Technical National Section, N.E.L.A., Philadelphia, stated that the business supplies a necessary commodity which is made possible by the use of capital utilized by the engineer and converted by him into physical properties and electrical energy. He said the engineer must have records which he can understand and that the engineer must realize the major part played by such records supplied by the accounting department. He urged closer cooperation between the two sections in their future activities.

Rate Cases

H. M. Brundage, vice-president, The Empire State Gas and Electric Association, New York, addressed the meeting on the accountant's relation to rate cases. He stated that rate cases before utility commissions and federal courts were entirely different, and that while rather informal procedure might sometimes be used in the former case, this is entirely untrue in the cases before federal courts. He said that companies should be forearmed for rate cases before federal courts, as they were always a gruelling struggle and frequently extended over long periods of time. Some of the more important points stressed by Mr. Brundage were soundness, thoroughness and completeness of the accounting methods and routine. He stated the burden of proof in recent years had rested primarily on the shoulders of the accountant.

He said the status of the accountant had been raised rapidly. After his address Chairman Little expressed the belief that this paper was the most valuable contribution that had been made to the Accounting National Section of the National Electric Light Association. It was the sense of the meeting that the paper was of such importance that it should be printed and distributed to all member companies.

Joint Committee Urged

The report of the expansion and scope committee was presented by H. M. Edwards, New York Edison Company, New York. In it the committee urged that subjects having more than section interest be handled by joint committees of the sections concerned instead of a general committee. The entire report was accepted.

Chairman Little read a resolution prepared by the executive committee of the section, which urged the establishment of a Director of Accounting of the National Electric Light Association at the national headquarters, who would deal exclusively with accounting problems. The resolution was unanimously adopted.

CONVENTION ENTERTAINMENT

Entertainment features, planned for those few hours when there were no business sessions, filled the rest of the time for the convention delegates. The first entertainment provided for the visitors was a luncheon given by the San Francisco Electrical Development League on Monday. At this meeting nationally known leaders of the electrical industry presented concise remarks concerning conditions with which they were particularly conversant.

The president's reception, held Monday evening at the Fairmont Hotel, attracted nearly two thousand delegates who were welcomed by a receiving line headed by President Franklin T. Griffith, Mrs. Griffith, Miss Harriet Griffith, J. E. Davidson, R. F. Pack and Mrs. Pack; H. T. Sands, Mrs. Sands and their daughter, Miss Helene M. Sands; P. S. Arkwright and Mrs. Arkwright; W. A. Jones and Mrs. Jones; W. E. Creed and Mrs. Creed; Frank A. Leach, Jr., and Mrs. Leach; M. H. Aylesworth and A. Jackson Marshall. After the reception the formal ball was held in the Gold Room.

Four hundred women attended the tea given by the Women's Committee, Public Relations National Section, at the St. Francis Hotel on Monday afternoon. Miss R. E. McKee, chairman of the committee, presided at the meeting which was addressed by President Franklin T. Griffith, Martin J. Insull, chairman of the Public Policy Committee; and M. S. Sloan, chairman of the Public Relations National Section. All of the speakers complimented the women upon their work and recommended the continuance of their efforts to inform the women of the country concerning the activities of the electrical industry. On Tuesday afternoon over three hundred women took advantage of the opportunity to visit San Francisco's Chinatown. The visiting ladies were shown the principal points of interest, tea being served at one of the Chinese cafes. Itinerant orchestras and groups of entertainers were a feature of Tuesday

evening's program, which provided for private dinner parties at many of the hotels and cafes.

Prizes of an attractive nature, as well as individual favors, featured the bridge tea given the women delegates on Wednesday afternoon at the Hotel Whitcomb. Over three hundred were in attendance.

Gala Night

Thursday brought forth a variety of entertainment features starting with an automobile tour of the city in the morning and afternoon and concluding with the Gala Night program in the Exposition Auditorium in the evening. Approximately four hundred women enjoyed the automobile trip, which included a luncheon at the Cliff House. A diversified program including a tug-of-war, musical numbers and special entertainment was presented to over four thousand men and women who attended Gala Night. Following the entertainment program, the floor of the main auditorium was cleared for informal dancing.

A boat ride on one of the electrically driven ferries of the Key System Transit Company was enjoyed by about five hundred people on Friday afternoon. The vessel made a comprehensive circuit of San Francisco Bay, giving the visitors an idea of the extensiveness of the natural harbor.

Golf, due to the intensive interest in the business sessions, was neglected during most of the week. On Saturday and Sunday prior to the opening of the convention groups of delegates assembled at nine country clubs where guests' privileges had been secured for them. Following the closing of the convention, these same clubs were hosts to numerous parties.

To Harness Small Streams

The potential power in the small streams so often found in the hills and lower mountains will be made available to the farmer or other user of small units of power through the advent of a small lighting and power outfit manufactured by the Rodney Hunt Machine Company of Orange, Mass. This machine will develop sufficient power from a head of only ten feet to supply the ordinary farm, including the usual out-buildings, water pump, household appliances and a small power motor.

The generator outfit is of the turbine type, and the generator itself is arranged to charge a set of storage batteries of 88-ampere-hour capacity, eight-hour rating. The battery serves as a reservoir for reserve power and also to keep the voltage constant. Operation is planned to be such that when the batteries are charged fully and there is no power demand the generator may be switched onto a set of resistances to prevent burning out the generator. This resistance may be in the form of a water heater if so desired, or the energy may be wasted through a water rheostat.

The automatic operation is the feature of this outfit. This is accomplished by means of switch-board control which makes it unnecessary to visit the plant more than twice a month.

Hetch Hetchy Hydroelectric Development of the City of San Francisco

By P. J. Ost

Electrical Engineer, City of San Francisco

IN 1910 the city of San Francisco voted a bond issue of \$45,000,000 for the purpose of securing an adequate water supply for the city from the Sierra Nevada, utilizing the Hetch Hetchy Valley in the Yosemite National Park as one of its main storage reservoirs. The reservoir, which is the lowest in elevation of the main reservoir sites, is 3,720 ft. above sea level, while the city of San Francisco is at an elevation of from 0 to 300 ft. Allowing sufficient head to cause the water to flow by gravity from the reservoir to San Francisco, a distance of 170 miles, there still is available approximately 2,800 ft. of fall which may be utilized to develop electrical energy.

While it was necessary to proceed immediately to develop the water in order to hold the grant given to the city of San Francisco by Congress in 1914, it is not necessary that this water be delivered in San Francisco before 1930 or 1932. The development of the water storage and aqueduct facilities in the mountains involved the expenditure of a great deal of money from which no immediate revenue could be derived except through the development and utilization of the power. As a means of carrying the interest on the money expended in developing the water sources, M. M. O'Shaughnessy, city engineer, in charge of the project, recommended the construction of one of the power plants, which would fit in best with the water development and offer possibilities of the greatest revenue with the least additional expenditure.

The plant selected as the first development is located in the foothills at an elevation of 926 ft. above sea level on Moccasin Creek in Tuolumne County, Calif. Immediately above it is a sharp rise to a plateau stretching back to the base of the Sierra Nevada range. The elevation of this plateau varies from 2,500 to 5,000 ft. This plant is known as the Moccasin Plant, and is the lowest of a series of plants to be located along the Tuolumne River, which is the stream being developed for water supply. Two other major plants will be constructed later to take advantage of the difference in elevation between the

ONE of the latest additions to the ever-growing number of hydroelectric power houses on the Pacific Coast is the 80,000-kva. Moccasin plant of the city of San Francisco. This plant is the first of a string of plants projected to be operated by the supply of water that will flow from the Hetch Hetchy reservoir, in the Yosemite National Park, to the mains of the city of San Francisco. Many novel features have been incorporated into the project which, as a whole, represents the very latest in hydroelectric engineering.

main storage reservoirs and the forebay above the Moccasin plant.

The original \$45,000,000 bond issue, based on 1910 prices for material and labor, has been sufficient for the completion of the mountain division of the water supply project, the Moccasin power plant, the transmission line from the power house 98½ miles to San Francisco Bay and the bay crossing division of the main aqueduct.

The city of San Francisco already has been offered \$2,000,000 annually for the power delivered at the end of the present transmission line. This is equivalent to five per cent of the total in-

vestment outside of the bay crossing division, interest on which is being carried by the local water company. The receipt of this revenue will reduce materially the tax rate in San Francisco by removing the necessity for collecting money to pay the interest on the water bonds.

The forebay of the Moccasin plant will be the Priest Reservoir. This forebay has a capacity of 2,600 acre-ft. or over two days' flow of the aqueduct tunnel. The static head on the nozzles of the water wheels is 1,316 ft., and the effective head at full load is 1,250 ft.

Generating equipment consists of four 20,000-kva., 257-r.p.m., 3-phase, 60-cycle, 11-kv. units supplied by the General Electric Company. Each unit is driven by a double over-hung impulse water wheel furnished by the Pelton Water Wheel Company. Each wheel is of 12,500-hp. capacity. There also is mounted on an extension of the shaft a 250-volt, 140-kw. exciter. The plant is laid out to permit the installation of two additional units when the future plants farther up the Tuolumne River are constructed. These additional units will be required in order to regulate the load for all three plants and obtain a maximum power output with a uniform delivery of water to San Francisco. No forebay storage is available where the two upper plants are to be located.

The daily flow of 400,000,000 gallons, 620 sec. ft., is sufficient to operate only three units continuously

at full load. With the ultimate installation of six units the same output can be delivered on a 50 per-cent load factor. Likewise, the present four units will deliver full output at 75 per-cent load factor.

Hydraulic Development

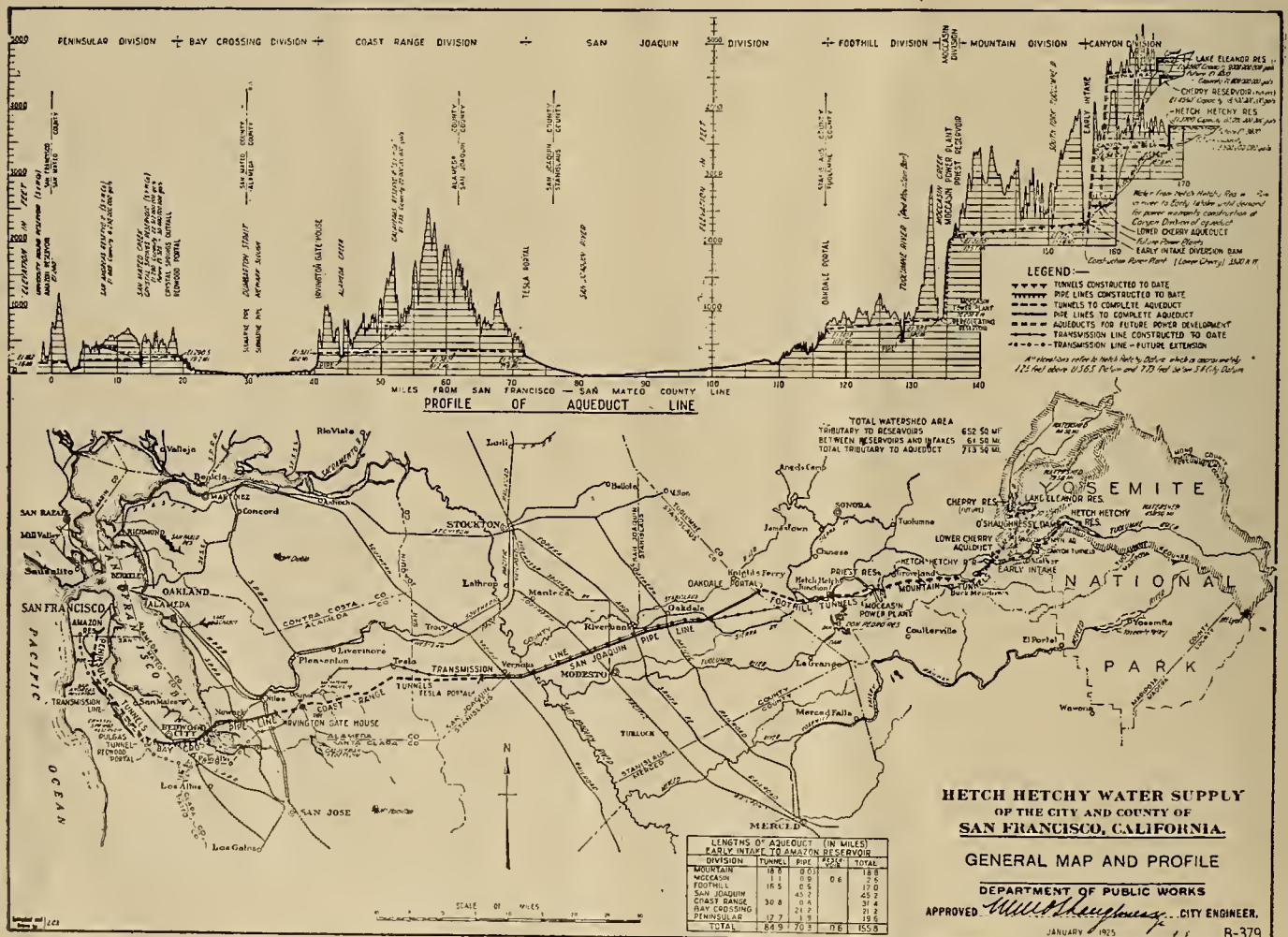
The present capacity of the Hetch Hetchy reservoir, formed by O'Shaughnessy Dam, is 206,000 acre-ft. As future needs arise, the dam can be raised to provide additional storage of 142,000 acre-ft. In addition to the storage at Hetch Hetchy is the reservoir at Lake Eleanor at an elevation of 4,660 ft. with a present capacity of 28,000 acre-ft. Plans for the future contemplate increasing the capacity of this reservoir to 218,000 acre-ft. The watershed of the Hetch Hetchy reservoir is some 459 square miles and that of Eleanor and Cherry 183 square miles.

At Early Intake, the beginning of the aqueduct, a 262-ft. concrete-arch dam rising 55 ft. above the river bed and extending 26 ft. below to solid granite diverts from the Tuolumne River water for San Francisco's requirements. This dam is 6 ft. thick at the crest and 16 ft. thick at the base. In the 130-ft. spillway, automatic gates have been installed; their function is to hold the water level 5 ft. above the lip of the spillway during the period of low water. A siphon arrangement automatically lowers these gates to pass excess floods and allows the gates to rise again after the high waters have subsided. The

headworks are equipped with suitable screens, sand traps and sluice gates. Tunnels totaling 18.8 miles in length convey the water from the intake to Priest Reservoir, which serves as the forebay for the Moccasin Plant. Approximately 11.5 miles of this tunnel are concrete-lined. The upper end, driven through solid granite, is unlined.

Priest Reservoir is formed by a dam with crest length of 1,160 ft. across Rattlesnake Creek. This dam is 147.5 ft. high and contains 717,283 cu. yd. of earth and rock fill and 17,043 cu. yd. of concrete in the core wall which extends 15 ft. into bedrock. Expansion joints divide the core wall into panels 50 ft. long by 16 ft. high. Copper water-stops totaling 27 tons of sheet copper were used in these joints. Rock for the toe of the embankment and for riprap came from the tunnel. Earth fill taken from the adjacent hills was placed partly by hydraulic methods and partly by steam shovel and dump cars, in the latter case being compacted by water.

A tunnel 5,370 ft. long and of 141.47 sq. ft. cross-section, and capacity of 1,240 sec. ft., carries the water from Priest Reservoir to the surge chamber. The surge chamber is 40 ft. in diameter, 160 ft. high and is designed to handle surges of 30 ft. with a full reservoir. All but the upper 48 ft. of the surge chamber is below ground, being 555 ft. back from the portals of the penstock tunnels.



Map showing the geographical relation between the Hetch Hetchy project and the city of San Francisco as well as the profile of the same territory

Three main penstocks, one of which is for future use, lead from the surge chamber. Each outlet is shaped like the frustrum of an oblique cone, the larger diameter of which is 12 ft. 4 in. A 104-in. riveted steel pipe connects to the smaller end of the cone and is equipped with a 104-in. butterfly valve at a point about 50 ft. outside the tunnel portal. Shortly below this point the diameter is reduced to 98 in. The butterfly valves are motor-operated and can be closed by remote control from the power house nearly a mile distant. For reasons of safety they cannot be opened by remote control. The length of each penstock is 6,025 ft., measured on the slope. At a distance of 2,111 ft. each of these pipes branches into two 66-in. pipes which continue with several further reductions in diameter on down to a point immediately outside of the power house where the diameter is 54 in. Here each of the 54-in. pipes branches into two 36-in. pipes in which are set extra-heavy, hydraulically operated, 36-in. valves. Thickness of penstock piping varies from $\frac{3}{8}$ in. at the surge chamber to 1-5/16 in. at the power house.

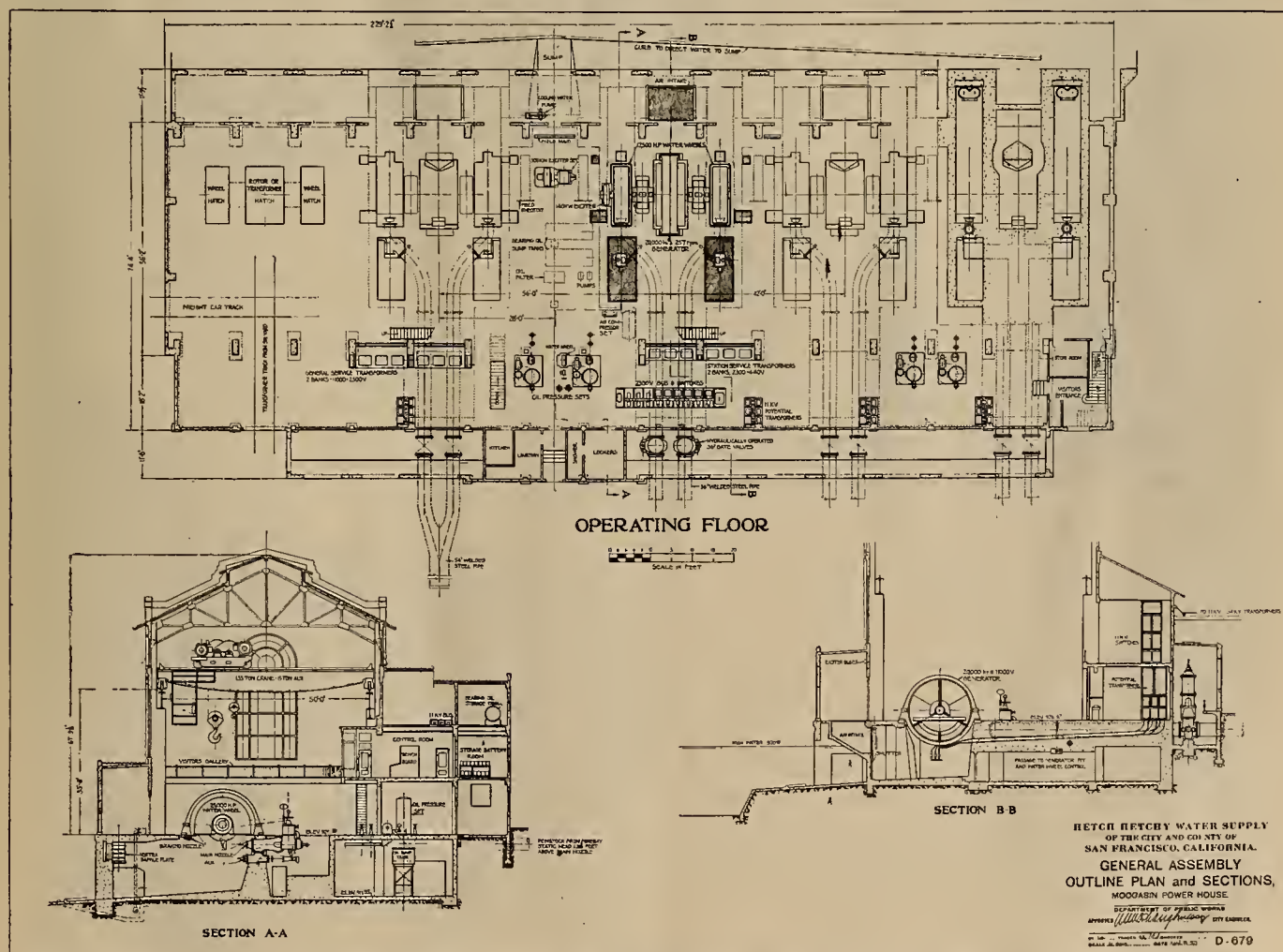
Building

The power house is 225 ft. long, 98 ft. wide and 67 ft. high. A basement extends 15 ft. below the main floor level. The architecture of this building is of a distinctly mission type, making it entirely different from any of the high-head power houses

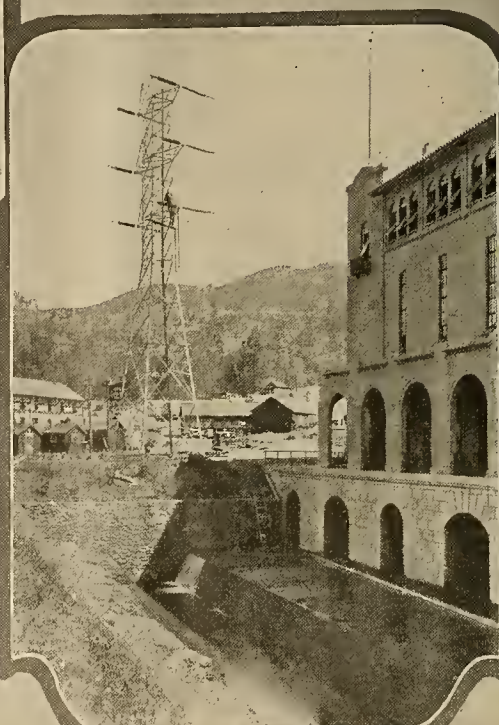
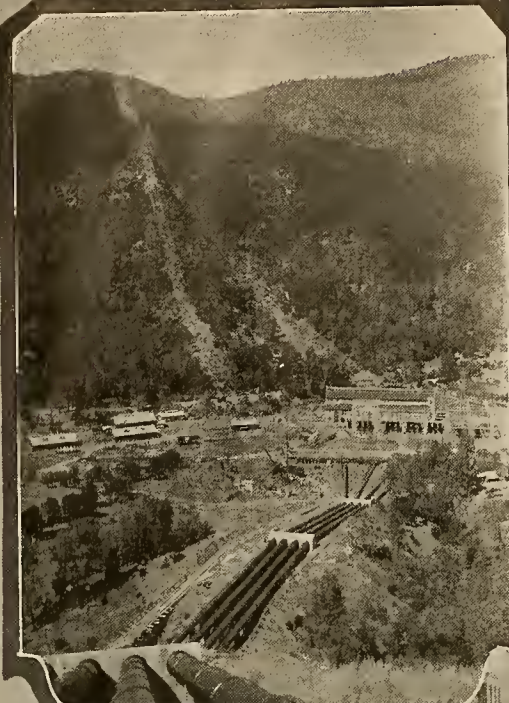
in the state. Arcades are provided on both sides of the power house. These not only follow out the mission style of architecture, but on one side provide shelter for the 36-in. hydraulically operated gate valves in the penstock lines that control the flow of water to the needle nozzles. On the opposite side of the building the arcade has gratings in the floor that admit cooling air to the generator pits. The vortex baffle plates receiving the discharge from the auxiliary needle nozzles also are located under this arcade. This arrangement of air intake and baffle plates permitted the lowering of the power-house floor sufficiently to provide additional power more than enough to pay the interest on any slight additional cost of construction. The building has a steel frame incased in light concrete walls.

Water Wheels

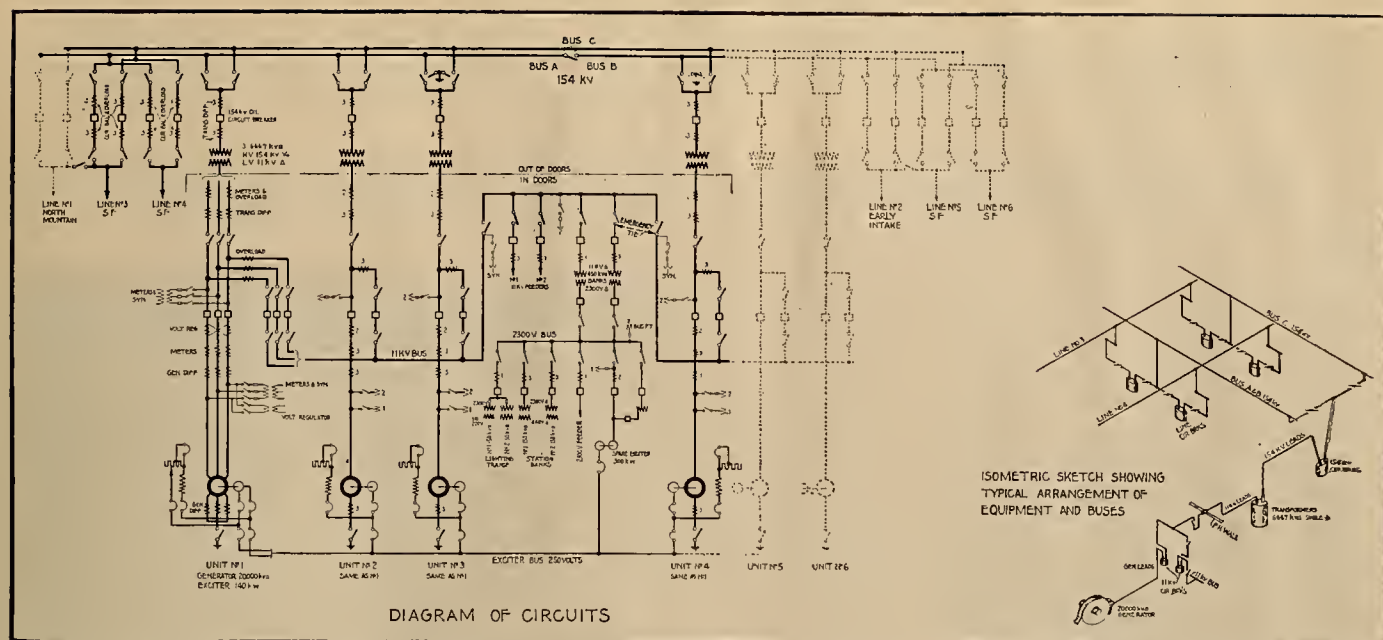
Water wheels are rated at 25,000 hp. per generator unit at maximum efficiency. They can develop 27,500 hp. at practically the same efficiency, making it possible to operate the generators at a slightly higher output when temperature conditions permit. These Pelton units are of the double-overhung, impulse-wheel type and are fitted with auxiliary relief needle nozzles which may be operated either as water saving or synchronous by-passes, as may be necessary to take care of the water-supply requirements. An individual oil-pressure set supplying oil under 150 lb.



Plan of the operating floor of the Moccasin power house, and sectional elevations showing the general arrangement of equipment



MOCCASIN power house represents the very latest in hydroelectric engineering as demonstrated by the views here shown. At the top of the page are shown a view down the penstock showing the transmission-line right-of-way on the opposite hill, and a general view of the bus structure. The center view shows the generator floor with the operating room overhanging at the left. Above is shown part of the 11-kv. bus structure and to the right a corner of the power house and tower No. 1 of the 98-mile transmission line with the camp in the background. It may be noted that a line crew is on the tower engaged in cutting over the last jumpers. About two hours later the line was energized for the first time (June 23).



Wiring diagram of the Moccasin power house. At the right is shown a schematic, isometric sketch of the major electrical connections

pressure is provided with each unit to actuate the governors. Two governors are supplied with each unit, one being connected with each of the two water wheels.

Several new features lead to simplicity of operation: the speed can be raised or lowered from the switchboard; the amount of load can be limited from the switchboard; and units can be completely shut down from the switchboard. Special mechanical arrangements permit shifting from hand control to automatic control by moving only one lever. A further refinement causes both the automatic and hand-control mechanisms to be synchronized so that the throw-over may take place without any hunting action of the governor or any change in water-wheel speed. Large enameled indicators permit the operator to observe the position of the needle nozzle from the switchboard room. The pit around the governor mechanism is covered with Irving subway grating, thus making it possible to observe the action of the servomotor from the operating floor. This construction also gives direct daylight into the pit. The control mechanism and generator pit are readily accessible from the basement by a tunnel through the foundation.

Generators and Transformers

Generator rotors are mounted on the water-wheel shaft between the two wheels.

Two cast-steel flywheels machined to receive the pole pieces form the spider. The machine is inclosed in a sheet-steel housing which causes air to be taken from the pit under the generator and delivered out through the windings into the generator room. The amount of air to be handled is 60,000 cu. ft. per min. Ample outlet for the heated air is provided at the top of the generator room.

As indicative of the rate at which water wheels and generators are increasing in size, it is interesting to note that when this project first was studied units of 12,500-kva. capacity were the largest which could

be purchased. However, when the time came actually to order the machines, 20,000-kva. units were readily obtainable. One unit of this capacity is sufficient for charging an unloaded transmission line, the line requiring approximately 17,000 kva. at 154 kv. The characteristics of the generators will prevent their being self-exciting when carrying this load. This makes it possible to put a single generator on a transmission line and gradually build up the voltage without fear of exceeding the desired voltage at the delivery end of the line.

Transformers furnished by Westinghouse Electric & Manufacturing Company will step the voltage to either 115 kv. or 154 kv. for transmission over the two lines running to Newark on San Francisco Bay.

Regulators and Switchboards

All machines are controlled from the switchboard located at one side of the center of the building. The design of the plant contemplates that a generator with its associated bank of transformers will be operated as a unit. Units will be connected only on the high side of the step-up transformers. This arrangement does away with a complicated system of 11-kv. switches and buses and materially simplifies the whole power-house layout. To take care of station power requirements, supply two local 11-kv. feeders and in emergency permit any generator to be connected to any bank of transformers, one 11-kv. bus has been run the full length of the power house. Normally this will be connected to but one generator at a time.

A Westinghouse broad-range type of regulator is provided for the exciter of each generator, and for a spare motor-generator exciter which has sufficient capacity to supply excitation to two generators. Field-control boards for all units have been placed on the main floor adjacent to the exciters. Field switches and field rheostats of the size employed are remotely controlled under any circumstances. The placing of these adjacent to their point of use in-

volved the extension of only the control circuits and permitted the shortening of the very heavy leads necessary to carry field currents.

Switching Apparatus

On account of the ideal topography at the powerhouse site, it was possible to install all of the high-voltage switches and buses outside the power house. The 11-kv. leads from the generator switches are carried overhead on a steel structure from the building to the low-voltage bushings on the transformers. From the high-voltage bushings the power may be taken to either of two high-voltage buses. The present installation includes four banks of three 6,667-kva., single-phase transformers and one spare transformer. These transformers are of the oil-insulated, water-cooled type fitted with cooling-water and temperature alarms which register on the switchboard. Cooling water for the transformers is pumped from the tailrace rather than use water from the penstocks. On account of the high head involved this effects a saving amounting to 60 kw. under full-load conditions.

High-voltage buses connecting transformers to transmission lines are of 750,000-circ. mil stranded copper. High-voltage connections for individual units are made of standard 2½-in. wrought iron pipe. Connections for the transmission lines are made of 2½-in., extra-heavy pipe. As far as possible, high-voltage oil switches were replaced with air-break switches at an appreciable saving in cost. This necessitated a very careful arrangement of interlocks between switches. As a further precaution a complete arrangement of semaphore signals and light signals has been installed to prevent the wrong throwing of a switch by hand. All of the air-break switches, with the exception of the bus sectionalizing switch, are power-operated direct from the switchboard. A lookout window in the back of the power house permits the operator to overlook the switch yard and penstocks without getting far away from the operating room.

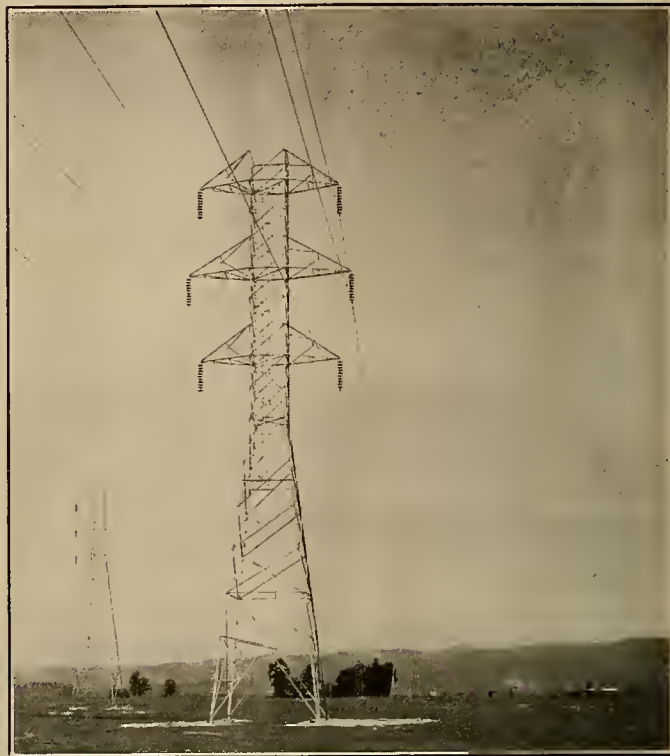
Transmission Lines

Two transmission lines connect to the high-voltage buses at the present time. Power from the upper plants later will be brought down over two new transmission lines into the same buses. By that time two additional transmission lines will have been constructed from Moccasin to the Bay region, thus making six lines connected to the Moccasin buses.

The present two lines are carried on five hundred and six 98-ft. steel towers over the 98½-mile stretch. The route crosses due west over the San Joaquin Valley four miles north of Modesto on the northerly side of a 190-ft. right-of-way. The lowest cross-arm is 62 ft. above ground level. Conductors of each circuit are spaced 15 ft. apart vertically. The horizontal distance between the wires at the top and bottom crossarms on the tower is 24 ft. and at the middle arm 28 ft. Average spacing between towers in level country is 950 ft. while the spacing in the rougher country varies from 350 to almost 2,400 ft. No very cold weather is experienced, and the line has been strung for a maximum tension of 5,000 lb.

at 20 deg. F. and allowing a side-wind pressure of 8 lb. per ft. This results in a normal tension of from 3,000 to 3,700 lb. in the line under average temperature conditions.

On that portion of the line at a distance from the salt fogs of San Francisco Bay a 397,500-circ. mil, steel-reinforced, aluminum cable supplied by the



Hetch Hetchy transmission line just east of Newark, Calif.

Aluminum Company of America has been installed. Adjacent to the bay, 9 miles of line are strung with conductors of stranded copper with hemp core having a copper cross section of 345,000 circ. mil. The physical size of this cable is that of a 425,000-circ. mil cable with the seven center strands replaced by a saturated hemp rope. This gives a conductor of ¾-in. external diameter, which is necessary in order to prevent excessive corona when operating at 154 kv. This conductor was supplied by the Anaconda Copper Mining Company.

Four types of transmission towers are used in the line. These are classified as follows: standard towers, for normal conditions of stress and spacing; heavy duty towers, for angles, points of heavy pull-downs and railroad crossings; switch towers, for accommodating air-break, line-sectionalizing switches; and transposition towers. Towers are of galvanized steel and were supplied by the Pacific Coast Steel Company.

Ten Westinghouse No. 601 insulator units are used at suspension points, while at points of greater stress 12 Westinghouse No. 631 units are used. As far as possible in the construction of the line dead ends were avoided. Where heavy loading was encountered that made it desirable to secure strength above that supplied by the standard tower, a heavy-duty tower was erected and equipped with ten No. 631 units in a string.

IDEAS FOR THE CONTRACTOR

Chico Contractors Organize and All Become Electragists

A local association of contractors was recently formed in Chico, Calif. One of the first acts of the members was to join the California Electragists, which includes membership in the Association of Electragists, International. The Association of Electragists was organized for the protection of the public against inferior workmanship and materials, and as a fire-protection measure. The new members gladly subscribed to a pledge which obligated them to high standards of business practice that would meet the approval of the public generally and of their business competitors and associates.

Considerable publicity was obtained for the new association in an article appearing in the Chico Record which told of the formation of the new association and gave the names of its members. It also outlined some of the history and principles of the Association of Elec-

tragists, International. As a further means of advising the public of their new affiliation, the members had a 4-column 10-in. advertisement inserted in the newspaper calling attention to the necessity of having a responsible contractor do electrical work and also of having periodic inspections, in addition to announcing their membership in the Association of Electragists, International.

Tentative Electrical Safety Orders Are Approved at Public Hearings.—Public hearings were held in San Francisco May 26, and in Los Angeles June 2, on the tentative Electrical Safety Orders of the Industrial Accident Commission of California. They were approved at each of these hearings with a few minor changes. The final draft now is being prepared and will be sent to the state printer at once. It is expected that final copies will be ready for distribution about Sept. 1, 1925.

Announcing a New Service for Electrical Contractors

Realizing the need for a forum for the exchange of ideas in the electrical contracting field, particularly with reference to problems of estimating, the Journal of Electricity is publishing a series of articles on this subject by a recognized authority, the first of which appears in this issue.

J. R. Wilson, engineering department, Los Angeles Electric Works, has been secured to write this series. Mr. Wilson has been in the electrical construction industry for the past twenty-eight years. He first entered the industry in



J. R. WILSON

1897 in the construction department of the Chicago City Railway Company. He later moved to Cleveland, Ohio, where he specialized in Class-A building installations. From 1911-1914 he was city engineer for Hudson, Ohio. In 1920 he came to California with the J. G. White Engineering Corporation, superintending the electrical construction in the \$3,000,000 sulphuric plant of the General Chemical Company at El Segundo, Calif. Since 1921 he has been active in the electrical construction field in Los Angeles, both in building construction and industrial plant installations. Mr. Wilson has been with the Los Angeles Electric Works since 1922. He has been an active leader in educational and organization work in the electrical industry.

It is the object of this series to discuss the problems which daily are confronting the electrical contractor, and every effort will be made to make it of practical value. The text will be supplemented with drawings and pictures wherever possible. The cooperation of our readers is invited to make this series of the greatest value to them; criticisms and suggestions will be welcomed.

CALLING AN ELECTRICIAN MAY SAVE CALLING THE FIRE DEPARTMENT

Faulty electrical wiring and connections are responsible for many fires in the homes; and it takes an **EXPERT ELECTRICIAN** to find and correct the faults.

Doctoring up your electrical equipment is like doctoring yourself. You may bit upon the right treatment—but if you don't, the results are disastrous.

Your electrical problems should be turned over to the man who thoroughly understands electricity. Your electrical wiring is safest in the hands of an **EXPERIENCED ELECTRICIAN**.

Better Electrical Work

REGULAR INSPECTION of wiring and equipment is an important **FIRE PREVENTION** measure. Calling an electrician may save calling the fire department.

What hands and feet are to a man, the electrical contractor is to the electrical industry; for his progress, the electrical contractor is indebted to leadership within his own group, and it is with pride your electrical contractors announce their membership and affiliation with the

INTERNATIONAL ASSOCIATION OF ELECTRAGISTS

We, the Chico members of the International Association of Electragists, are anxious to serve you with **BETTER ELECTRICAL WORK**.

Boblett Manufacturing Co.

628 Main Street

Gas & Electric Service Co.

233 Broadway



Bird Electric Co.

309 Main Street

Chico Electric Supply Co.

542 Broadway

This 4-column 10-in. advertisement was used by the members of the Chico contractors' association in announcing its affiliation with the Association of Electragists, International.

Electrical Estimating for the Contractor — I

The First of a Series of Articles on This Subject by a Successful Contractor in Business at the Present Time

By J. R. WILSON*

Engineering Department, Los Angeles Electric Works

Estimating contract work of any kind may be compared to a chemical formula because it is composed of certain things that must be mixed in the proper proportions to make a finished product which will give the results desired.

The ingredients necessary to produce an estimate that will attain the desired result, a fair profit on work done, are analysis, judgment, engineering experience and practical experience. The proportions in which these are mixed will depend upon the person making up the estimate.

Analysis is the most important factor of an estimate, and the degree to which a man is able to separate a job into its component parts and to analyze each part is the real factor which determines whether a job will show a profit or loss.

Judgment is attained only through personal experience. After a piece of work has been separated into the different classifications in which it naturally belongs, a man's judgment must tell him the different "factors of grief" he probably will have to contend with should he be fortunate (or unfortunate) enough to be awarded the contract.

Engineering experience necessary to successful estimating can be determined only by the class of work a contractor intends to engage in. On small jobs on which contracts are made usually very little engineering ability is required. This assertion does not hold in the electrical and mechanical lines, however, as in those callings a very small job may require a great deal of engineering knowledge and may be very complicated. On large jobs it is essential that the contractor be competent to check the architect's or engineer's plans and specifications or to prepare such plans or specifications should the need arise. In appraisal work, which contractors very often are called upon to do, engineering knowledge is essential, especially in estimating depreciation on machinery and equipment. Some contractors with whom I am acquainted personally have a very small amount of engineering ability, and yet they are making money. It is my personal opinion that they would make much more were they not limited in their scope by their lack of technical training. I firmly believe that to be successful in any line of contract work a mixture of at least a reasonable amount of technical training and a large amount of practical experience makes the winning combination.

Practical experience in doing any particular kind of work should be the largest factor used in making up an estimate. A man who has had very little practical experience and depends upon some one else to make up his estimates on contract work always is "treading on thin ice," and the danger increases as the size of the contract increases. The amount of practical experience a man has had largely will determine his success as a contractor.

Engineering degrees and books are very well in their place but in the

actual placing of the materials and the making of a finished job experience is gained that cannot be duplicated in any college or library.

Of course, a contractor who is doing a large volume of work cannot be expected to do his own estimating, any more than a "merchant prince" would do his own clerking. But so many times we see a man who has made a wonderful success as a "small time" contractor fail dismally as a "real" contractor. This may be due to several of many causes, but I believe that investigation proves that in any specific case the fault has been that the man did not use good judgment in his methods of estimating.

After graduating from the small-time class he either has attempted to continue doing his own estimating which, owing to lack of time, results in too much guessing, or else he has relegated this important duty to a \$30-a-week clerk or someone else just as incompetent.

Money spent in employing a competent estimator is the very best investment that can be made in any contracting business. As far as practicable every contractor should check the estimates that are sent out under the name of his firm. This checking may be as simple or as elaborate as the contractor himself feels is necessary. Inasmuch as his money is involved in the transaction, he certainly should be interested enough to want to know where it is going. An incompetent estimator can ruin a contractor very quickly if no check system is used on his estimates.

Even on so-called "quantity surveys" each contractor is entitled to a set of plans from which to check the estimate and should demand these plans and check them before submitting his bid.

Estimating is just as much a profession as the practice of medicine or law, and the competent estimator usually has spent as many years learning his profession as has the doctor or lawyer. Therefore, a competent estimator is entitled to adequate compensation for his services. As you give so shall you receive, and no man can do his best work unless he is being well paid for his time.

This is not meant to convey that a man who calls himself an estimator should be rated immediately as a high-salaried employee. An estimator worthy of the name should be willing to submit proof as to past performance or should be willing to "try out the job" before expecting to receive the highest rate of compensation.

To the man with an analytical turn of mind electrical estimating offers one of the most fascinating and satisfying professions there are. The field of the electrical industry is so large and varied that a man may spend a lifetime in one branch of the business and become familiar only in a very slight degree with other branches of the industry. In the field of materials alone new types are being placed on the market every day, and a man constantly must study his trade journals in order to be famil-

iar with the latest types of labor- and money-saving devices and stay in the forefront of the profession.

In analyzing a job the first requisite is to separate the work into the different classifications in which the operations will be performed. This separation will be regulated to a very large extent by the type of building. No job can be estimated intelligently unless certain fundamental data are available, and the only way to determine how much of these data is necessary is to divide the work into separate parts. Then experience will tell what information is missing from the plans and specifications.

If the necessary information is not obtained before the bid is submitted and the contract signed, the contractor may find himself let in for a great deal of additional expense which he did not contemplate. There is usually a clause in all building specifications requiring the contractor to furnish "anything needed to make a complete job—whether same be specifically mentioned in the specifications or shown on the plans." This clause might be beaten if taken to court, but usually the cost of court action is too great for a contractor to take a chance on losing the case. The safest way is to study the job thoroughly, demand the information you need, and "watch your step." The things which will cost the most money usually are those that are forgotten.

The size of the job will determine the number of parts into which the work should be separated.

On a small power job the divisions will usually work out as follows:

- Service wires
- Service conduit
- Service switch
- Service fuses
- Service head
- Meter loop
- Service ground
- Secondary ground
- Motor wires
- Motor conduits
- Motor switches
- Motor fuses
- Control equipment.

A small lighting job almost always will lend itself to the following classifications:

- Service wires
- Service conduit
- Service head
- Service switch
- Service fuses
- Meter loop
- Service ground
- Secondary ground
- Branch circuit cabinets
- Branch circuit fuses
- Branch circuit wires
- Branch circuit conduits
- Branch circuit switches
- Branch circuit base plugs
- Branch circuit floor plugs
- Lighting fixture equipment
- Lamps

Regardless of the size of the job, the above items will enter into it to a greater or less degree, and each item will require explicit information. Every item represents money to be spent for materials and labor, and it is essential that the exact cost be known if the job is to show a profit.

On these small jobs usually each contractor has to make his own "layout" as the owner does not feel inclined to pay an engineer to draw plans and specifications. If the job is located where adequate inspection is required, the owner probably will receive a good job, and the prices submitted will not vary to a large extent.

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NEWS OF THE INDUSTRY

Pacific Gas and Electric Company Will Enter Merchandising Field

Increased sales activity calling for the addition of 150,000 hp. of connected load within the next six months and embracing the cooperation of power companies, manufacturers, jobbers, contractors and dealers throughout northern California has been announced by the Pacific Gas and Electric Company. Every current consuming factor, with the exception of lamp-socket devices, is embraced in the plans for the sales drive, some of the major items being 4,000 electric ranges and 2,000 electric water heaters.

This sales effort has been made necessary by the addition of approximately 200,000 hp. to the installed capacity of the system during the next sixty days. This increase in capacity includes 75,000 kw. from the company's Pit No. 3 plant which will be ready for operation July 18; and part of the output of the Copco No. 2 plant of The California Oregon Power Company that has been contracted for by the Pacific Gas and Electric Company. The plant will be ready for operation late in July or early in August.

The sales drive, which is in addition to sales plans for the year involving budget expenditures of \$500,000, involves two major premises. In the first place the company will not sell lamp-socket devices directly. It will encourage the sale of these appliances through existing dealers. Direct sales efforts of the company, in cooperation with other branches of the industry, will be confined to the following:

1. Electric ranges.
2. Electric water heaters.
3. Electric air heaters of 1-kw. capacity and upward.
4. Lighting.
 - a. Kitchen
 - b. Lamp sales
 - c. Commercial
 - d. Signs
 - e. Industrial
5. Electric trucks and electric refrigerators.
6. Industrial heating.
7. Isolated plants.

More than 200 salesmen and sales engineers will be utilized in the execution of the plans. The plans were worked out under the supervision of H. M. Crawford, sales manager of the company.

The range and water heater activities call for the installation of 4,000 ranges representing an investment of \$800,000 installed and 2,000 water heaters representing an investment of \$200,000 installed. The quota of the Great Western Power Company, which is working in close cooperation in the drive, is approximately half this number of ranges and water heaters. Ranges and water heaters will be sold at list prices with exceptional terms to large dealers, department stores, household furnishing goods stores and furniture stores in

order to secure their cooperation. A flat fee will be charged for installation. All wiring will be done by contractors. The installation charges which are considerably cheaper than prevailing averages are:

City	Terms	Cash
Range only.....	\$60	\$54
Range and Water Heater.....	80	72
Water Heater only.....	30	27
Country	Terms	Cash
Range only.....	\$40	\$36
Range and Water Heater.....	60	54
Water Heater only.....	30	27

The power company will handle all contracts for installation even when the range is sold by some other agency. Competitive bids will be asked from contractors on the wiring. Terms offered to consumers on ranges and water heaters are one-tenth of the list price down and the balance in 20 months. For installation the terms are nothing down and the contract price in 20 months. All salesmen will work on a salary and commission basis. Bonuses will be paid salesmen, and standard campaign methods will be employed using contests of various sorts.

Lighting activities will center around a kitchen-lighting campaign which also will embrace the sale of lamps and color and decorative lighting for the home. Commercial lighting activities will follow the same plan employed a year ago (Journal of Electricity, Mar. 1, 1924, p. 165) with the cooperation of manufacturers, jobbers and contractors. A traveling display similar to that of the California Electrical Bureau will be taken over the territory and demonstrated to merchants. In industrial lighting a number of trained illumination salesmen will canvass all factories, survey lighting conditions and recommend improved lighting systems. In increasing sign lighting, salesmen will work in cooperation with sign manufacturers.

Electric trucks and electric refrigerators will be sold through established channels of distribution with power company men working in cooperation with manufacturers in overcoming sales resistance. Industrial heating will be sold in cooperation with the manufacturers of heating equipment. Two trained sales engineers will work on isolated plants in an endeavor to connect these loads to the lines of the central station.

A large amount of direct-mail and newspaper advertising will be employed. Work is under way at the present time in recruiting the sales force necessary to execute the drive. Classes are being held, and salesmen are being given the necessary training to equip them for the work. It is expected that the drive

will be under way shortly after July 1.

As far as Western power companies are concerned this is the greatest commercial activity ever undertaken by a single company.

Contract for Hetch Hetchy Power Disposal Prepared

An ordinance providing for the temporary distribution of Hetch Hetchy power over the lines of the Pacific Gas and Electric Company was passed to print by the San Francisco Board of Supervisors on June 18 by a vote of 11 to 7. This action broke a deadlock over the price to be paid for the energy from the 80,000-kw. Moccasin power plant which is now ready for operation. Before signing the contract, which is acceptable to the utility company, city officials are endeavoring to secure the assurance of the Secretary of the Interior and the Attorney General's office that the contract is not in conflict with the requirements of the Raker Act, which granted the Hetch Hetchy project to the city.

In the negotiations for the disposal of the power the utility company offered the city the sum of \$2,000,000 a year for the 400,000,000-kw-hr. estimated output, and the city countered with the demand for \$2,583,000. This offer was refused by the company on the grounds that it is purchasing power from other agencies at a less rate per kilowatt-hour.

The present proposed contract provides that the utility will pay the city \$2,000,000 a year for the power which is to be delivered at the company's Newark substation. The contract may be terminated by either party on one day's notice.

Following the passing of the ordinance by the Board of Supervisors the directors of the Modesto Irrigation District, which also takes water from Tuolumne River, unanimously adopted a resolution condemning the proposed contract. The action was taken on the ground that the contract violated the Raker Act in that it did not make proper provision for the requirements of the Modesto Irrigation District. Copies of the resolution of the irrigation district have been mailed to the Secretary of the Interior and the Attorney-General.

On June 29 the Board of Supervisors finally passed the ordinance directing the Board of Public Works to sign the contract with the Pacific Gas and Electric Company. The ordinance was signed by Mayor Rolph.

Power Lines May Serve Washington District.—The construction of a transmission line by the Puget Sound Power & Light Company to serve the Newaukum Valley district, south and east of Chehalis, Wash., along the Pacific Highway, is being considered seriously.

Washington Company Sells 375 Ranges in Six Weeks

As the result of six weeks' intensive effort, electric ranges and water heaters with a total gross sales value of \$80,000 were placed in service on the lines of The Washington Water Power Company recently. In addition to the sales value of the merchandise, the company has benefited to the extent of having its annual revenue increased by \$30,000.

The number of electric range users was increased from 16.6 per cent of the residential consumers to 18 per cent, and the company feels the opportunity for increasing the number of ranges on its system has been bettered. During the time that the campaign was in progress a total of 375 ranges was sold, most of which were installed with an electric water heater. The company now has over 6,000 ranges on its lines.

The campaign just completed featured the Hotpoint Super-Automatic range of the Edison Electric Appliance Company, Inc., and a price was determined upon that included the range, water heater, wiring and installation. An aluminum cooker unit was offered with the range. In planning the campaign Lewis A. Lewis, sales manager, R. B. McElroy, assistant sales manager, and J. F. Farquhar, general agent, set quotas for the Spokane territory and for those outlying towns directly served by The Washington Water Power Company. The quota for Spokane was 200 and for the remainder of the territory 130. Final results showed the following:

	Spokane	Outside Towns (Served directly (by W. W. P. Co.))	Total
Population	118,000	62,000	180,000
Residential consumers..	26,363	8,550	34,913
Ranges sold—			
Super Automatic	158	69	227
Other Hotpoint	67	40	107
Other makes	19	22	41
Total sold	244	131	375
Gross sales value.....			\$ 80,000
Average price for installation (range and water heater)			\$215

The sales policy employed was much the same as that used by the company about a year ago (Journal of Electricity, Aug. 1, 1924, p. 102), the city salesmen being allowed the regular commission of 10 per cent. Special prizes were awarded each week to the three salesmen selling the greatest number of ranges. Five out of the eight city salesmen oversold their quotas, thus winning bonuses of \$25 each.

Advertising in the campaign included the use of newspapers, broadsides, and in Spokane two illuminated billboards located on principal street car lines. The broadsides were mailed to all residential consumers during the first week of the campaign.

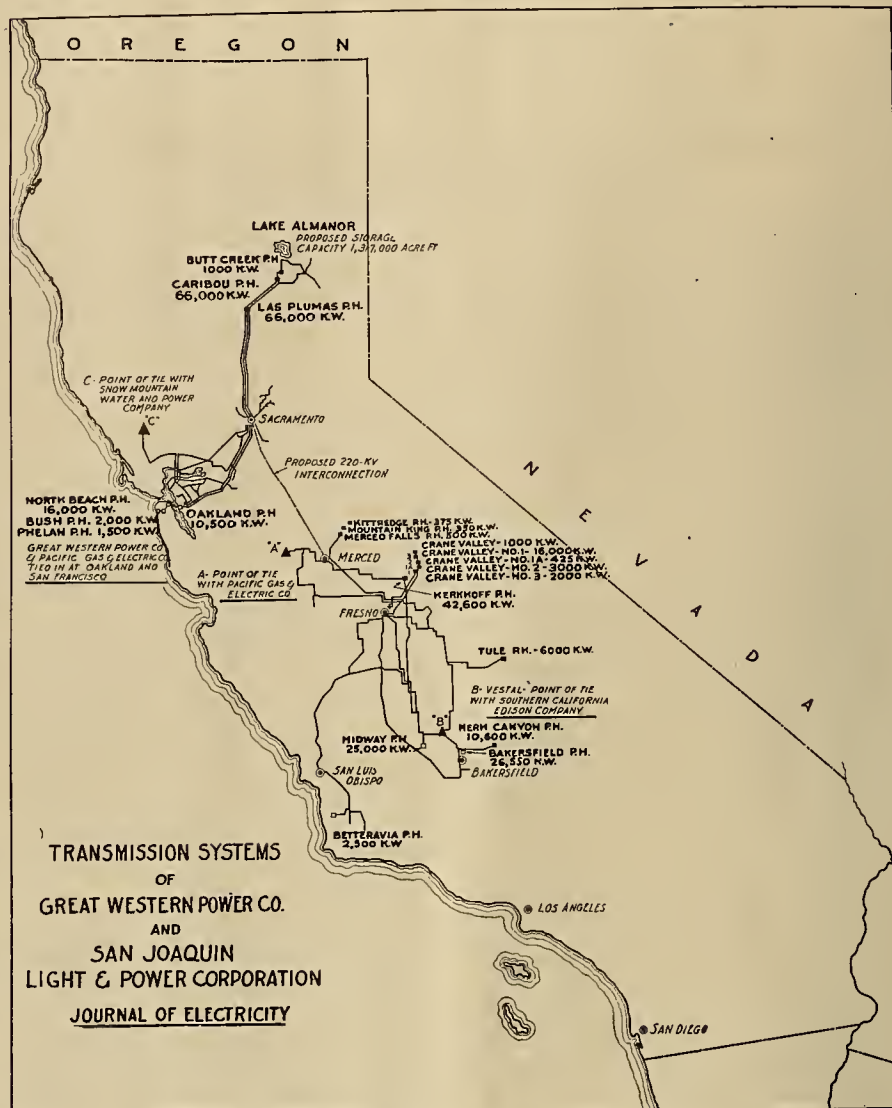
New Holding Company Is Headed by Stone & Webster

A syndicate composed of Stone & Webster, Inc., Chase Securities Corporation, Blodgett & Company, and Blair & Company has formed the Engineers Public Service Company, Inc., to acquire and operate public utility properties directly or through subsidiaries. It is announced that through its initial purchase the new company will acquire more than two-thirds of the common

stock of the Virginia Railway & Power Company, Richmond, Va., and has contracted to purchase directly or through a subsidiary the entire capital stock of the Spottsylvania Power Company, Fredericksburg, Va.

The policy of the new company, as

announced, is to acquire additional public-utility properties when obtainable at satisfactory terms. Several other properties are now under consideration. The company has placed on the market 200,000 shares of \$7 dividend preferred stock which is being offered at \$100.



Map of Great Western Power Company and San Joaquin Light & Power Corporation systems showing (dotted line) location of 220-kv. line to be constructed in near future

Great Western Power Company to Erect 220-kv. Double-Circuit Line

Application has been made to the California Railroad Commission by the Great Western Power Company of California for permission to begin construction of a double-circuit 220-kv. steel-tower transmission line which will connect its system with that of the San Joaquin Light & Power Corporation. The power line will extend from Brighton, near Sacramento, to Merced, a distance of 104 miles. The cost, including substation equipment, will be approximately \$2,750,000.

Preliminary engineering work having been finished, the Great Western company now is ready to begin actual building operations. The company, in addition to applying for permission to erect the line, requested authority to exercise certain franchises granted to the company by San Joaquin, Stanislaus and Merced Counties.

It is planned to operate the power line initially at 165 kv., but it will be designed for 220 kv. Steel towers of the double-circuit type, with one circuit installed, will be erected. A radio carrier-current telephone system will be installed to follow the course of the transmission line.

The new transmission line, contemplated when the San Joaquin Light & Power Corporation was purchased by the Western Power Corporation, holding company of the Great Western company (Journal of Electricity, Dec. 1, 1924, p. 417, and Dec. 15, 1924, p. 454), will enable the two companies to interchange energy directly. The raising of the Big Meadows Dam (Journal of Electricity, April 15, 1925, p. 295), also is part of the development program undertaken by the Great Western company to provide additional capacity.

Great Western to Take Output of Buck's Creek Plant

Contracts for the output of the Buck's Creek plant of the Feather River Power Company have been signed with the Great Western Power Company. The purchasing company will take delivery at the power house, the current to be metered on the secondary side of the transformers.

The Buck's Creek plant, to be located on the Feather River in northeastern California, will have an installed capacity of 60,000 hp. and will operate under a head of 2,580 ft., according to Lars Jorgensen, head of the engineering department of the company. No definite date has been given for the starting of construction on the plant, which is to be the first development of a series of seven, with a total ultimate capacity of 415,000 ft., contemplated by the Feather River company. (Journal of Electricity, May 1, 1925, p. 334)

Permit for Elwha River Site Is Given Washington Utility

Permit to appropriate 600 sec. ft. of water from the Elwha River in Clallam County, Wash., for hydroelectric power development, has been granted the Northwestern Power & Light Company of Port Angeles by R. K. Tiffany, Washington supervisor of hydraulics. It is estimated that 10,227 hp. can be developed, using the water under a 150-ft. head. The company also was granted

permission to construct a reservoir to store 15,000 acre-ft. of water. The project will cost approximately \$800,000.

The concrete diversion dam for the power project is to be approximately 160 ft. high, with a length of 400 ft. on top. The penstocks are to be one-tenth of a mile long, of steel construction, and are to be approximately 10 ft. in diameter throughout. The impounding dam for the storage reservoir will be of the same dimensions as the diversion dam.

Power is to be developed by a vertical reaction turbine connected direct to an a.c. generator. Construction on the development, which is known as the Glines Canyon project, is to begin by Aug. 1, 1925, and is to be completed by Dec. 31, 1926.

Electric Home Is Displayed by Seattle Electric Club

The official opening of the electric home in Winona Park, Seattle, built in connection with the "Own Your Own Home Exposition" under the auspices of the Electric Club of Seattle and the Seattle Real Estate Board, occurred on June 10. The home was given away on June 22, the closing night of the exposition to the holder if the winning admission ticket.

The home, a modern five-room bungalow, represents an outlay of \$7,500.

A. J. Lutz of the Pacific States Electric Company was chairman of the Seattle Electric Club's committees, and

Harry Byrne, of the North Coast Electric Company, was vice-chairman. The various chairmen and committeemen were:

Executive Committee—J. D. Ross, City of Seattle; J. J. Hayes, Westinghouse Electric & Manufacturing Company; W. M. Meacham, Meacham & Babcock; S. G. Hepler, Arrow Electric Company; L. R. Grant, Puget Sound Power & Light Company.

Finance Committee—J. J. Hayes, chairman; Harry J. Martin, National Carbon Company; George Reiniger, Globe Electric Company; Grover Burke, City Electric & Fixture Company; J. H. Kelly, Western Electric Company.

Advertising Committee—L. R. Grant, chairman; A. E. Williams, City of Seattle, Light Department; J. R. Murphy, General Electric Company; Paul Miller, Westinghouse Electric & Manufacturing Company.

House Wiring Committee—W. M. Meacham, chairman; C. G. Zokelt, Northwest Engineering Company; C. B. Campbell, 516 Seneca Street; J. J. Agutter, J. J. Agutter Company.

Appliance Committee—J. H. Kelly, chairman; Roy Constable, Forbes Supply Company; Fred Block, Pacific States Electric Company; L. S. Rubles, North Coast Electric Company; D. U. Chamberlain, Globe Electric Company.

Exposition Committee—Joe Wells, chairman; W. E. Jones, Economy Fuse Manufacturing Company; Harry Byrne, North Coast Electric Company; S. Sinex, Puget Sound Power & Light Company.

Suit to Prevent Diversion of Merced River Filed

Suit to enjoin the Merced Irrigation District from proceeding with the construction of the Exchequer Dam and the diversion of water from the Merced River has been filed in the Merced County Superior Court by James J. Stevinson in the name of a corporation owning much land in Merced and Stanislaus Counties. The corporation complains that the value of the land will be impaired if the flow of water in the river is diminished.

The suit is similar in nature to that filed against the Southern California Edison Company in Fresno County by the Herminghaus estate in which judgment was returned against the power company. This latter case has been appealed to the higher courts. (Journal of Electricity, June 15, 1925, p. 600.)

Many Prominent Eastern Manufacturers Attend N. E. L. A. Convention

Conspicuous among the delegates in attendance at the National Electric Light Association convention held in San Francisco June 15-19, were many prominent Eastern and Middle Western manufacturers. That so many gave the time and incurred the expense necessary to make the trip to the Pacific Coast is

evidence of the interest being taken by Eastern business men in the expansion of Western business and an acknowledgment of the active part being played by the West in the progress of the industry. Among the representatives of manufacturing concerns registered were the following:

Banet, R. J.
Bole, Allen
Brown, A. A.
Brown, George N.
Campbell, Reginald M.
Cleary, James
Conrad, N. J.
Curtis, Augustus D.
Doane, S. E.
Dowd, H. Charles
Duersten, W. E.
Dwelle, G. M.
Eckert, G. E.
Flory, A. C.
Freeman, G. A.
Gallagher, W. N.
Gauntlett, Gordon C.
Glodschmidt, E. W.
Goodrich, E. L.
Gray, C. B.
Griggs, H. L.
Greene, J. J.
Harvey, Irwin J.
Hawley, Kent A.
Herr, E. M.
Hill, Charles L.
Hoit, J. D.
Howland, L. D.
Hughes, George
Hurley, Edward N.
Hurt, C. H.
Jaeger, A. H.
Jaques, C. F.
Johnson, J. A.
Jones, E. H.
Kauffman, T. J.
Kearney, James R.
Keating L. M.
Lamkey, Stanley G.
Lambert, M. B.
Leah, Elmer, Jr.
Lewis, N. E.
Lillibridge, Ray D.
Lindemann, A. L.

Utensils Co.
National Pole Co.
Westinghouse El. & Mfg. Co.
Pittsburgh Transformer Co.
Sangamo Electric Co.
Combustion Eng'g. Corp.
Schweitzer & Conrad, Inc.
Natl. Lamp Wks. of G.E. Co.
Natl. Lamp Wks. of G.E. Co.
Ray D. Lillibridge, Inc.
American Resistor Co.
Kelvinator Corp.
R. Thomas & Sons Co.
Allis-Chalmers Mfg. Co.
Walker Vehicle Co.
Automatic Elec. Washer Co.
Safety Insurance Wire Co.
Wagner Electric Corp.
Wheeler Condenser & Eng. Co.
Natl. Lamp Works of G.E. Co.
The Bristol Co.
Johns-Manville, Inc.
Aluminum Co. of America
Locke Insulator Corp.
Westinghouse El. & Mfg. Co.
California Wire Co.
Line Equipment Sales Co.
Bailey Meter Co.
Edison, El. Appl. Co., Inc.
Hurley Machine Co.
Sangamo Electric Co.
Edison Elec. Appliance Co.
Rathbone Sard Elec. Co.
Kuhlman Electric Co.
California Wire & Cable Co.
Square D Co.
W. N. Matthews Corp.
Ohio Brass Co.
Walker Vehicle Co.
Westinghouse El. & Mfg. Co.
The Leach Co.
Babcock & Wilcox Co.
Ray D. Lillibridge, Inc.
A. J. Lindemann & Hoverson

Fort Wayne, Ind.
Escanaba, Mich.
New York City
Pittsburgh, Pa.
New York City
Detroit, Mich.
Chicago, Ill.
Cleveland, Ohio
Cleveland, Ohio
New York City
Milwaukee, Wis.
Detroit, Mich.
Milwaukee, Wis.
Chicago, Ill.
Newton, Iowa
New York City
New York City
Carteret, N. J.
Cleveland, Ohio
Waterbury, Conn.
New York City
Pittsburgh, Pa.
Victor, N. Y.
New York City
Orange, Calif.
Cleveland, Ohio
Cleveland, Ohio
Chicago, Ill.
Chicago, Ill.
Chicago, Ill.
Aurora, Ill.
Bay City, Mich.
Los Angeles, Calif.
Detroit, Mich.
St. Louis, Mo.
Mansfield, Ohio
Chicago, Ill.
East Pittsburgh, Pa.
Oshkosh, Wis.
New York City
New York City
Milwaukee, Wis.

Lovejoy, J. R.
Maddox, G. F.
Maxwell, M. P.
Merrill, G. S.
Moe, Henrik
McIlvane, W. J.
McIver, J. W.
McManis, Thomas J.
Naugle, J. B.
Nelson, H. E.
Nelson, George
Noyes, Ernest H.
Ogg, H. L.
Osborn, M. C.
Page, A. D.
Pace, T. J.
Pfau, Arnold
Presbrey, J. O.
Price, R. F.
Pyle, W. F.
Reagan, F. H.
Richards, T. T.
Rucker, Geo.
Rudd, H. H.
Schwartz, Michael
Scott, Roscoe E.
Searle, C. E.
Seaver, Harry G.
Shute, Henry D.
Sniffin, E. H.
Steinmetz, Jas. A.
Stringfellow, G. E.
Swayze, F. H.
Swope, Gerard
Taylor, H. Birchard
Terry, F. S.
Thomson, P. L.
Tripp, Guy E.
Veach, J. S.
Watkins, J. W.
Wemple, J. Herbert
Wescott, E. C.
White, E. Cantello
Wilson, R. B.
Zimmerman, P. B.

General Electric Co.
Delta Star Electric Co.
The R. Thomas & Sons Co.
Natl. Lamp Works of G.E. Co.
Moe-Bridges Co.
W. N. Matthews Corp.
Edison Lp. Wks. of G. E. Co.
General Electric Co.
Naugle Pole & Tie Co.
Automatic Elec. Washer Co.
Wagner Electric Corp.
Aluminum Co. of America
Automatic Elec. Washer Co.
Landers, Frary & Clark
General Electric Co.
Westinghouse El. & Mfg. Co.
Allis-Chalmers Mfg. Co.
The Miller Co.
Century Electric Co.
Duncan Electric Mfg. Co.
Locke Insulator Corp.
Wagner Electric Corp.
Holophane Glass Co.
Ry. & Industrial Eng. Co.
The Miller Co.
Natl. Lamp Works of G.E. Co.
Allis-Chalmers Mfg. Co.
The Servel Corp.
Westinghouse El. & Mfg. Co.
Westinghouse El. & Mfg. Co.
American Resistor Co.
Edison Storage Battery Co.
Western Electric Co.
General Electric Co.
Wm. Cramp & Sons
Natl. Lamp Works of G.E. Co.
Western Electric Co.
Westinghouse El. & Mfg. Co.
Ohio Brass Co.
Ohio Brass Co.
Edison Lmp. Wks. of G. E. Co.
The Okonite Co.
Tork Company
El. Vacuum Cleaner Co., Inc.
Natl. Lamp Works of G.E. Co.

Schenectady, N. Y.
Chicago, Ill.
New York City
Cleveland, Ohio
Milwaukee, Wis.
St. Louis, Mo.
Harrison, N. J.
Schenectady, N. Y.
Chicago, Ill.
Newton, Iowa
Chicago, Ill.
Chicago, Ill.
Newton, Iowa
New Britain, Conn.
Harrison, N. J.
East Pittsburgh, Pa.
Milwaukee, Wis.
Cleveland, Ohio
St. Louis, Mo.
Lafayette, Ind.
Baltimore, Md.
St. Louis, Mo.
New York City
Greensburgh, Pa.
Meriden, Conn.
Cleveland, Ohio
Milwaukee, Wis.
New York City
East Pittsburgh, Pa.
East Pittsburgh, Pa.
Philadelphia, Pa.
West Orange, N. J.
New York City
Schenectady, N. Y.
Philadelphia, Pa.
Cleveland, Ohio
New York City
New York City
Mansfield, Ohio
Mansfield, Ohio
Harrison, N. J.
Passaic, N. J.
New York City
Cleveland, Ohio
Cleveland, Ohio

Pacific Coast Electrical Association

William Baurhyte Is Elected P. C. E. A. President at Annual Meeting

The election of William Baurhyte, Los Angeles Gas and Electric Corporation, as president, along with a long slate of officers for the coming year, brief reports from Frank A. Leach, Jr., Pacific Gas and Electric Company, retiring president of the Association, J. F. Pollard, Coast Valleys Gas & Electric Company, treasurer, and S. H. Taylor, secretary, were the principal features of the annual meeting of the Association held at the Exposition Auditorium, San Francisco, June 15. The meeting was held prior to the annual convention of the National Electric Light Association, and was addressed by Franklin T.



WILLIAM BAURHYTE

Griffith, president, and M. H. Aylesworth, managing director of the national organization.

Due to the small amount of time available for the annual meeting of the Association, the reading of the president's and secretary's reports was dispensed with, and these will be published in the July 15 issue of the Journal of Electricity.

In commenting on the work that the Association had done during his administration, President Leach stated that the reports of the sections of the Association as they had been published would be considered the reports of chairmen. He complimented the entire membership of the Association on the cooperation that had been shown and upon the excellence of the work that had been done during the year.

The report of the nominating committee as read by Lee M. Newbert, Pacific Gas and Electric Company, chairman, was adopted unanimously by the Association members and the secretary was directed to cast an unanimous ballot for the election of the following:

President, William Baurhyte, Los Angeles Gas and Electric Corporation.

First vice-president, S. Waldo Coleman, Coast Counties Gas & Electric Company.

Second vice-president, W. L. Frost, Southern California Edison Company.

Treasurer, J. F. Pollard, Coast Valleys Gas & Electric Company.

Executive committee: F. A. Leach, Jr., Pacific Gas and Electric Company; F. E. Boyd, General Electric Company; F. H. Woodward, Great Western Power Company; A. E. Holloway, San Diego Consolidated Gas & Electric Company; F. O. Dolson, The Southern Sierras Power Company; A. M. Frost, San Joaquin Light & Power Corporation; D. E. Harris, Pacific States Electric Company; J. C. Rendler, J. C. Rendler, Inc.; C. T. Hutchinson, Journal of Electricity; C. E. Heise, Westinghouse Electric & Manufacturing Company; P. M. Downing, Pacific Gas and Electric Company; and A. B. Day, Los Angeles Gas and Electric Corporation.

Following the election, the newly elected officers, with the exception of W. L. Frost, were escorted to the platform and at the suggestion of Mr. Leach, president of the Association, each of the gentlemen addressed the meeting. Mr. Baurhyte, in acknowledging the honor bestowed upon him, stated that he hoped that the excellent cooperation of the entire membership of the Association would be given him as had been given President Leach. The newly elected president complimented the reports of the sections as they had been presented in the Journal of Electricity, and expressed hopes that next year's work would be as productive.

Mr. Coleman assured the Association that he would give his support to Mr. Baurhyte during the coming year and expressed the hope that despite the fact that the past year has been the best the Association has known, that next year's work would be even better.

In addressing the Pacific Coast Association as managing director of the N.E.L.A., M. H. Aylesworth stated that one of the reasons that San Francisco, and particularly the Pacific Coast, had been chosen for the 48th convention of the N.E.L.A., was that this section of the United States had taken the lead in three of the most important sub-

jects that would be discussed during the convention. These three subjects are: first—the interconnection of electric utility systems, permitting the exchanging of large blocks of power over a wide territory; second—the customer-ownership of utility companies; and, third—the electrification of agriculture.

Meeting Is Held by Technical Executive Committee

Matters dealing with the past year's work and plans for that to be done during the coming year were discussed at a meeting of the executive committee of the Technical Section, P.C.E.A., held at the Palace Hotel, San Francisco, on the morning of June 15.

The matter of discussion of the many papers submitted covering the work of the Technical Section of the Association was the first to be brought to the attention of the members of the executive committee by P. O. Crawford, the retiring chairman. The fact that all of these papers were presented solely through the columns of the Journal of Electricity instead of orally, as is the usual custom, makes the adequate discussion of these papers somewhat more of a problem than is usually the case. Inasmuch as full discussion of these papers is necessary if they are to be of full value and use, it was urged that each committee (formerly bureau) chairman make special effort to obtain the submission of such discussion for subsequent publication. It was suggested that each chairman should assume the responsibility of approaching those within his circle of acquaintance who would qualify for this purpose.

An outline of a report to cover the activities of the Technical Section for the past year was checked over by Mr. Crawford and the assembled committee chairmen to assure its completeness and correctness. Following this, and an expression of gratitude from Mr. Crawford for the splendid cooperation of the various members of the executive committee of the section, the meeting was turned over to R. R. Cowles, Pacific Gas and Electric Company, vice-chairman.

Meetings as definitely settled upon for the coming year for the Technical Section are as follows:

General and executive committee meeting in September, to be held in Los Angeles; in January, 1926, to be held in San Francisco; in March, 1926, to be held in Fresno.



When the N.E.L.A. delegates on the Orange Special arrived in Spokane, they were taken to the Long Lake plant of The Washington Water Power Company in automobiles furnished by that company, the Western Red Cedar Association and the electrical fraternity of the city. Near the plant the eastern visitors were greeted by two families of Indians, who gave Indian names to four of the Chicago members of the party—Martin J. Insull, Middle West Utilities Company; Marshall E. Sampsell, Central Illinois Public Service Company; B. J. Mullaney, Commonwealth Edison Company, and George N. Nelson, Wagner Electric Corporation. Mr. Nelson and Mr. Sampsell are shown decorated by their newly acquired Indian friends.

Meetings

Northwest Association Elects Officers for 1925-26

Lewis A. Lewis, sales manager, The Washington Water Power Company, was elected president of the Northwest Electric Light and Power Association at the annual meeting of the organization held in Portland, June 12. The meeting was brief, lasting but one hour after R. M. Boykin, manager central district, Puget Sound Power & Light Company, president, called the meeting to order.

Reports were read by W. A. White, Puget Sound Power & Light Company, secretary and treasurer; A. S. Moody, General Electric Company, chairman membership committee; W. H. Ude, The Washington Water Power Company,



LEWIS A. LEWIS

chairman Public Relations Section; F. H. Martin, chairman credentials committee. The report of A. N. Cudworth, Northwestern Electric Company, chairman of the Accounting Section, was not presented as it had been printed in booklet form. J. F. Orr, Idaho Power Company, chairman Commercial Section, was unable to be present, and W. A. White announced that the section's report had been printed.

H. H. Schoolfield, Pacific Power & Light Company, chairman of the Technical Section, reporting for that subdivision, announced the progress made in line with eliminating difficulties for radio users and reported on an attempt to institute legislation prohibiting farmers from moving hay derricks under high-tension lines. The meeting voted to place this last matter in the hands of the Public Relations Section.

The constitutional amendment committee, headed by George L. Myers, Pacific Power & Light Company, reported that it favored a change in the method of assessing dues of member companies from the present one of determining the dues on population to one based on a percentage of gross revenue. Under the plan suggested the companies are to be assessed 0.00017 per cent of their gross annual revenue. The plan was adopted as presented by the committee. Several other minor changes were adopted as submitted in a written report.

The report of the nominating committee, naming the following men for

the coming year was presented and unanimously adopted:

President—Lewis A. Lewis, The Washington Water Power Company.

Vice-president for Idaho—R. B. King, Idaho Power Company.

Vice-president for Utah—D. C. Green, Utah Power & Light Company.

Vice-president for Oregon—George L. Myers, Pacific Power & Light Company.

Vice-president for Washington—N. W. Brockett, Puget Sound Power & Light Company.

Vice-president for Montana—A. T. Schultz, Helena Light & Railway Co.

Members-at-large of executive committee—A. C. McMiken, Portland Electric Power Company; J. Caldwell, Western Electric Company.

During the meeting N. W. Brockett was elected an honorary member of the Association. No action was taken on the transfer of the British Columbia Electric Railway Company, Ltd., from membership in the Canadian Electrical Association, the Canadian division of the N.E.L.A., to the Northwest Electric Light and Power Association. Definite action was deferred pending action by the N. E. L. A., as it was considered that a constitutional amendment was necessary.

Boulder Dam Association Holds Meeting at Ontario

More than two hundred representatives of civic and community organizations of California, Arizona and Nevada came together at the annual meeting of the Boulder Dam Association at Ontario, Calif., on June 13. This organization has as its object the putting through of the Swing-Johnson Bill, which provides for the construction by the federal government of a high dam at Boulder Canyon on the Colorado River.

John L. Bacon, mayor of San Diego, president of the association, introduced Arthur P. Davis, former head of the United States Reclamation Service who, as the principal speaker, advocated immediate construction of this dam. Mr. Davis stressed the fact that it was necessary to construct this dam on the Boulder Canyon site not only for water and power but also as a flood-protection measure to the Imperial Valley. Great satisfaction was expressed by the delegates at the heavy vote polled at the recent election in Los Angeles in favor of the \$2,000,000 bond issue for preliminary investigations of the Colorado River.



News of the Electragists



Plans Completed for Divisional Electragists' Convention

Plans have been completed which assure the success of the divisional convention of the California Electragists which will be held at the Eureka Inn, Eureka, Aug. 6-8.

The program as outlined at present is as follows:

Thursday, Aug. 6, 9:00 a.m.—Executive committee meeting. 2:00 p.m.—General open meeting. 2:00 p.m.—Auto tour up the coast for ladies.

Friday, Aug. 7, 8:00 a.m.—Leave for day in logging woods, including trip to electric mills. 1:30 p.m.—Lumberjacks' dinner served in camp cookhouse. 9:00 p.m.—Ball (informal).

Saturday, Aug. 8, 6:00 a.m.—Golf. 10:00 a.m.—Baseball (Contractors vs. Jobbers). 1:30 p.m.—Special feast prepared by Eureka boys in beautiful Sequoia Park. 6:30 p.m.—Banquet. 8:30 p.m.—Dancing.

The Humboldt County Electragists have a few unannounced surprises in store for those attending. The registration fee is \$5 per person, which includes admittance to the ball, banquet and sightseeing trips.

Reservations

In discussing the subject of reservations Victor Lemoge, president of the association, said: "All hotel reservations must be made through the San Francisco office of the California Electragists at 522 Call Building, and must be accompanied with registration fee. It is suggested that this be done at once. Those making reservations are requested to keep in mind the fact that in order to house everyone at the Inn, it will be necessary to put two, and in some cases three, in a room. Also kindly state the exact date of your arrival in Eureka. Will you be accompanied by your wife? If not, please state preference for fellow room mate.

No reservations will be accepted by the hotel, and should any have been forwarded to them at the present date, they will be canceled. The hotel people expect the organization to guarantee the reservations and this is the reason for the above."

Rates at the Eureka Inn are as follows:

European Plan	
Double room with bath (for two).....	\$5.00
Double room without bath (for two).....	3.50
Double room, twin beds (for two), with bath	5.50
Double room, twin beds without bath (for two)	4.00
Double and single with bath (for three).....	6.50

A number of delegates are planning to motor over the famous Redwood Highway which leads from Sausalito on San Francisco Bay to Eureka, a distance of 290 miles. It may be traveled in 12 to 16 hours and offers the motorist a splendid picture of northwestern California.

The Northwestern Pacific schedules are:

Leave San Francisco	Arrive in Eureka
Ferry Building	8:00 a.m.
8:15 p.m.	7:30 p.m.
7:45 a.m.	Arrive in San Francisco
Leave Eureka	9:05 a.m.
8:00 p.m.	7:35 p.m.
8:00 a.m.	
Ninety-day round trip tickets.....	\$19.20
Upper Berth	3.00
Lower Berth	3.75

By stage to Eureka, West Coast Transit Company, 75 Fifth Street, San Francisco:

Leave San Francisco	Arrive in Eureka
Daily	8:20 p.m.
6:45 a.m.	Arrive in San Francisco
Leave Eureka	8:05 p.m.
6:30 a.m.	
Fare one way.....	\$11.90
Round trip.....	18.00

Special arrangements have been made for the entertainment of the ladies and children.

Personals

C. M. Brewer, vice-president and general manager of the Mountain States Power Company, Albany, Ore., has been elected a member of the board of directors of the Standard Gas



C. M. BREWER

& Electric Company, Chicago, the parent company of the Mountain States Power Company, which is managed and operated by the Byllesby Engineering & Management Corporation. Mr. Brewer was born in Marshall, Mich., and received his education at the University of Michigan, graduating in 1904. In 1909 he joined the Byllesby organization at Muskogee, Okla., and the following year was transferred to Mankato, Minn. At about this time the Byllesby company entered the Northwest territory, and soon Mr. Brewer was transferred to Everett, Wash. After a short time there he was appointed manager of the Sandpoint, Idaho, division of the Mountain States Power Company, remaining there until 1912 when he was sent to manage the Byllesby company holdings in Richmond, Calif. In 1919 he was appointed to his present position. His election to the board of directors of the Standard Gas & Electric Company represents a recognition of satisfactory managerial service, and is intended to enlarge his scope of usefulness to his company.

R. D. Wichman, formerly electrical and civil engineer with the Pacific Gas and Electric Company, San Francisco, for the past three and a half years in charge of design of transmission substations, distribution substations, steam generating stations and steam heating plants, now is associated with Wichman & Albers, Engineers Service Bureau, 525 Market Street, San Francisco.

W. H. Frisby, electrical engineer and contractor of Provo, Utah, has been awarded the contract for the installation of that city's new whiteway lighting system. Work on the new system will be commenced as soon as equipment can be procured.

Dwight P. Robinson, of Dwight P. Robinson & Company, Inc., New York City, was one of a number of eminent engineers who attended the forty-eighth convention of the N.E.L.A. in San Francisco.

C. B. Hawley, general manager of the Intermountain Electric Company, Salt Lake City, Utah, and president of the Rocky Mountain Electrical Cooperative League, has been making an extended business trip East. While away Mr. Hawley expects to attend several conventions, and to return home during the latter part of June.

F. M. Feiker, vice-president, The Society for Electrical Development, New York City, was among the prominent Eastern delegates to the N.E.L.A. convention recently held in San Francisco.

P. L. Thomson, publicity manager, Western Electric Company, Inc., New York, spoke to an interested audience at the joint meeting held by the San Francisco Advertising Club and Better Business Bureau during the week of the N.E.L.A. convention. His subject was, "Advertising as a Factor in Moulding Public Opinion." Arthur Rowe, of Garnett Young & Company, acted as chairman of the day.

F. H. Woodward, sales manager Great Western Power Company, of California, San Francisco, is making a trip East. He expects to visit Chicago, Cleveland and Detroit enroute.

D. L. Galusha, consulting engineer, Dwight P. Robinson & Company, Inc., New York City, was among those present at the recent N.E.L.A. convention held in San Francisco.

W. F. Wilson, formerly with Brown & Pengilly, Los Angeles, recently has become a representative of the Western Safety Manufacturing Company, with offices in San Francisco.

J. D. Hoyt, sales manager, Line Equipment Sales Company, Cleveland, Ohio, who attended the N.E.L.A. convention in San Francisco, intends to spend about a month on the Pacific Coast, returning East by way of the Northwest.

Martin J. Insull, vice-president Middle West Utilities Company, Chicago, was the principal speaker at the Down Town Association meeting held during N.E.L.A. convention week in San Francisco. Mr. Insull's subject was, "Public Confidence as a Necessity in Business."

F. L. Dole, vice-president of the Aeromotor Company, Chicago, was a recent visitor to the Pacific Coast, investigating local markets and reviewing the development which is taking place in the transmission fields of the West.

Alex Dow, president, Detroit Edison Company, Detroit, made an interesting speech on "Electric Service and What It Means to Community Growth" before the Union League Club luncheon meeting held in observance of "Electrical Week" in San Francisco.

Guy Tripp, chairman board of directors, Westinghouse Electric & Manufacturing Company, New York, chose as his subject, "The Future of California," in addressing the meeting of the Commercial Club, San Francisco, during "Electrical Week" observed by the clubs of the city in cooperation with the N.E.L.A. convention.

E. E. Whitehorne, commercial editor Electrical World, New York, addressed the Public Spirit Club, San Francisco, on "Electricity and the Public Spirit," during N.E.L.A. convention week.

Elmer Leach, Jr., of the Leach Company, Oshkosh, Wis., recently was on the Pacific Coast attending the N.E.L.A. convention and investigating the company's distribution problem at the same time.

F. G. Hamilton, until recently general superintendent of distribution, Southern California Edison Company, Los Angeles, has been appointed assistant manager of operation for that company. He succeeds R. E. Cunningham, who has been made operating electrical engineer. Mr. Hamilton has a record for long service with the company and its predecessors. He started with the Mt. Whitney Power & Electric Company in 1899 as lineman. Subsequently he served as trouble-shooter, substation operator,



F. G. HAMILTON

sub-district agent, power and lighting salesman, engineer and operator on several large pumping plant installations, and then was made division superintendent in charge of construction and operation in the territory including Exeter, Lindsay and Porterville, Calif. Later he became successively superintendent of distribution, purchasing agent and general superintendent of the western division. When the Mt. Whitney company merged with the Edison company in 1917 Mr. Hamilton was appointed distribution superintendent of the San Joaquin division. Seven years later he was made general superintendent of distribution.

M. S. Sloan, president, Brooklyn Edison Company, Inc., New York, and chairman Public Relations National Section, N.E.L.A., spoke on "Public Relations of Utilities" at the Kiwanis Club meeting held during "Electrical Week" in San Francisco.

Gerard Swope, chairman, board of directors, General Electric Company, Schenectady, N. Y., was the principal speaker at the Commonwealth Club's luncheon meeting held in observance of "Electrical Week" in San Francisco. Mr. Swope, a delegate to the N.E.L.A. convention, spoke informally.

Obituary

Mrs. Florence Britton, widow of the late John A. Britton, vice-president and general manager of the Pacific Gas and Electric Company, San Francisco, died June 23, in Redwood City, Calif.

R. C. Cole, sales manager of the electrical division, Johns-Pratt Company, Hartford, Conn., and associated with that company for the past twenty-five years, died May 10 in that city.

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

Get This! The Greatest Moving Flashing Window Display Ever Made!

No dealer's "selling help" we ever produced ever scored the instantaneous success of our latest moving, flashing Hold-Heet window sign. Think of a full size eight color cut-out sign that shows a woman using one of the famous Hold-Heet irons. While it glides the iron over the clothes with obvious ease, it also "flashes" a selling message that positively sells irons in a hurry. It works without attention day or night; it is the only electric combination moving and flashing sign in existence. Simply connect it to your electric circuit and it will start its job of attracting lookers to your window and buyers to your store. Once you get this trade magnet in your window, you will keep it there because it will sell more Hold-Heet irons for you than you ever thought possible.



You Can Get One Free!

This remarkable sign costs us real money because it's a real sign. Yet you can get one without expense. Your Hold-Heet jobber has a special deal on Hold-Heet irons—a liberal offer that you cannot afford to ignore if you want to sell a whole lot of irons this year. Ask him to tell you how you can get one of these moving, flashing signs, worth at least \$15, without cost to you. Don't delay. See your Hold-Heet jobber today or write to us direct. Remember this sign is not something that might build business—hundreds of dealers have proved its power. It wins for them—it will win for you. Act now.

RUSSELL ELECTRIC COMPANY

*The World's Largest Manufacturers of
Lamp Socket Heating Devices*

340 W. Huron Street

Chicago, Ill.

It Moves! It Flashes! It Sells Goods!

\$500,000!

**The Largest Order Ever Placed
for Consumer Advertising In
Electrical Appliance History!**

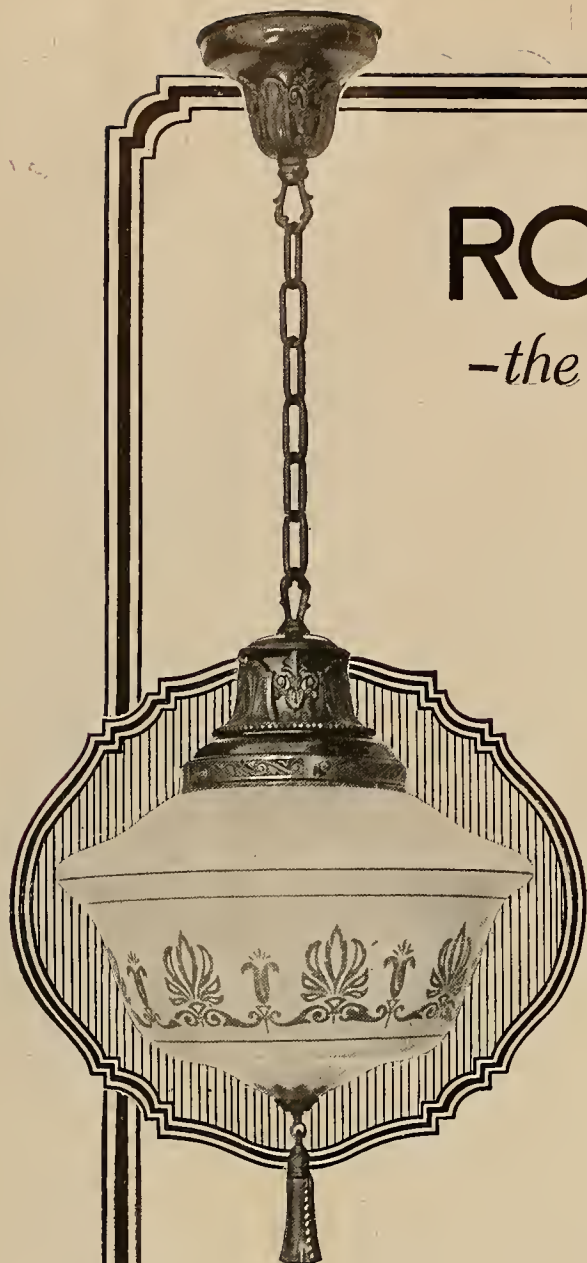
A perfect avalanche of Hold-Heet consumer advertising will start August 15th in Liberty, the fastest growing magazine in America. It has but one object—to put Hold-Heet merchandise 'way out in front—and to keep it there!

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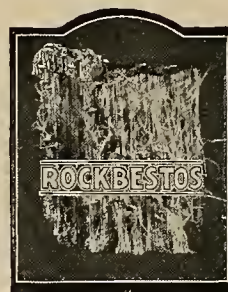
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To Dealers and Manufacturers

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LOS ANGELES

SAN FRANCISCO

Journal of Electricity

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Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

J. W. OTTERSON, Associate Editor
G. R. HENNINGER, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

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VOLUME 55

SAN FRANCISCO, JULY 15, 1925

NUMBER 2

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McGRAW-HILL COMPANY OF CALIFORNIA — 883 Mission St. — SAN FRANCISCO

Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

JAMES H. MCGRAW
PRESIDENT

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VICE-PRES. & TREAS.

WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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By McGraw-Hill Company of California

Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

McGRAW-HILL CO., Inc., New York
Publishers of

American Machinist—European Edition

(Published in London)

Industrial Engineer (Published in Chicago)

Electrical Merchandising

Chemical and Metallurgical Engineering

American Machinist

Ingenieria Internacional

Electrical World

Electric Railway Journal

Engineering and Mining Journal-Press

Bus Transportation

Engineering News-Record

Coal Age

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Power

Making Use of the Journal's Statistical Department

THROUGH its contact with the industry for many years and through its compilation of data and statistics regarding the growth and development of the power companies the Journal of Electricity has in its files an immense fund of information that is always available to its subscribers. This information includes everything from the kilowatt-hour generation of western companies to the names and addresses of western distributors of various electrical products.

Our subscribers constantly make use of this information as the following extracts from letters will show:

"I have been asked to deliver an address . . . on the relation of electricity to the mining industry. I will appreciate any information you can give me from the stories compiled by you related to this subject which will be of assistance in the preparation of this talk."

And another letter:

"An argument has recently arisen between a friend and myself, he contending that transmission line costs (3-phase, 110-kv.) average nearly \$50,000 per mile and I believing the figure nearer \$5,000 (everything included, right-of-way, etc.) As readers of your journal we feel that you might be able to give us some figures approximately correct for the Pacific Coast."

These are only two of the many recent letters of this character which have come to our office. We feel that our readers can make wider use of the data which has been compiled by us than they are doing at the present time. The editors willingly will attempt to answer all queries of this character which are put to them.

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EDITORIAL

Governor Pinchot of Pennsylvania Criticizes the Power Companies

GOVERNOR Gifford Pinchot of Pennsylvania apparently disagrees with most authorities regarding "giant power," superpower, electric rates and state and federal regulation of electric utilities. In a recent address before the Commonwealth Club of San Francisco, the chief executive of the Keystone State expressed the opinion that control of the electric monopoly is the most pressing economic question before the people of the United States today.

In support of his contention that state regulation was a partial failure and would fail even more dismally unless supported by federal regulation, Governor Pinchot cited the experiences of his own state. He pointed out that regulation in Pennsylvania is inadequate because 94 per cent of the farms in that state do not receive electric service. Again rates are discriminatory because the Philadelphia Rapid Transit Company, one of the largest consumers of energy in the state, paid 8.3 mills per kw-hr. while the average price paid by domestic consumers was 74 mills (7.4 cents) per kw-hr. Lastly he points out that the Pennsylvania Public Service Commission has no authority to regulate security issues by public service companies. The Governor based most of his exceptions upon statements made by Secretary of Commerce Hoover in an address before the N.E.L.A. convention.

In the main, the answers to Governor Pinchot's statements will be found in Secretary Hoover's speech, which is printed on another page of this issue. However, some of the points he raises need further rebuttal. His statements regarding rural service do not apply in the West. In California more than 60 per cent of the farms are electrified and many of the other Western states are not far behind this record. Surely state regulation has proved adequate in this respect. He should study the efforts which are being made by the National Committee on the Relation of Electricity to Agriculture before he criticizes the utilities for failure to serve the farmer.

In answer to his statements regarding rates, we recommend to him an article by Lester Ready, chief engineer of the California State Railroad Commission, also printed on another page of this issue. In his article Mr. Ready carefully points out the many reasons why the small consumer must pay more for his energy than the one who uses ten thousand times as much.

Financing as far as the light and power utilities are concerned need cause Governor Pinchot little

worry. In the majority of states security issues are subject to careful scrutiny by state commissions. In addition to this the utilities cannot afford to allow the least cloud of suspicion to shadow their financial operations because of the almost universal practice of taking the public into partnership through the sale of securities. The four and a half million owners of securities in the public utilities of the nation are an asset that the utilities zealously guard.

On the whole Governor Pinchot's arguments do not appear to be well founded. At least it appears that he is wasting his breath when he makes such criticisms of the electric utilities in a section of the country where the great majority of farms are electrified, where average rates are cheaper than in any other part of the nation, where customer-ownership had its inception and has made its greatest strides and where the greatest interconnected transmission system in the world is operating successfully despite state boundaries and lack of federal laws.

A \$5,000,000

Sales Program

DETAILS of the largest sales program ever announced by a Western utility were reported in the last issue of the Journal of Electricity. The Pacific Gas and Electric Company, in cooperation with other utilities in northern California and with manufacturers, jobbers, retailers and contractor-dealers, proposes to add 150,000 hp. in connected load to its lines during the next six months. Only a careful study of this announcement will bring out its full significance.

There will be more than 200,000 kva. of installed generator capacity come on the lines in northern California during this half of the present year. This is the inspiration for what has been designated as the \$5,000,000 campaign instituted by the central stations. Every load-building appliance will be sold, from ranges to lamps, and the story of the blessings of electrical service will be carried to every home and farm in the state.

From the angle of its effect upon the electrical trade, this situation is unique. More than 250 sales engineers will make the canvas of the territory, thus creating a great reservoir of good-will for electrical appliances. Into this the retailer and the contractor may dip at will, to his own profit. It is generally considered that from ten to twenty calls per sale for house-to-house canvassing are required. This leaves from nine to nineteen prospects partly sold on the electrical idea, at the disposal of the local trade, like

ripe fruit, still on the tree but ready to fall into the basket with a little shaking.

Another interesting phase of the policy to be pursued by the central stations is that all installation work is to be done by contractors, thus placing literally hundreds of thousands of dollars in new work right in the lap of that branch of the electrical industry.

Truly, while the fact that a \$5,000,000 sales program is in itself a staggering proposal for work of this kind, even in a land that has grown accustomed to dealing with superlatives in things electrical, yet, what seems to us even bigger is the sound policy that is back of the project. In a word, it consists in taking the established channels of trade into partnership on the deal, and working it out through the California Electrical Bureau, the state Association of Electragists, the jobbing, retail and other interests backed by all the power at the command of the central stations themselves. A bigger and brighter era dawns for the electrical industry in California.

Portland City Club Report on Columbia River

A TRULY illuminating report on "The Columbia River as a Waterway" has been issued by the City Club of Portland, and is reviewed in another section of this issue. The report, which discusses exhaustively the three uses to which the river can be put—navigation, irrigation and power development—will be recognized by engineers, government officials and others having an interest in the economic possibilities of the river as a distinct contribution to the available literature on the subject.

The Portland City Club, be it known, is one of the more serious-purposed of the civic clubs of the Oregon metropolis; its principal activity is to take up through committees the study of various local questions of timely interest, and to reach conclusions through reports based on such study. In the present instance, while the subject has a very definite local aspect, it is treated in a broad way, and because of the length and size of the river and the extent of the great basin drained by it and its tributaries the report will have an interstate if not a national significance.

Because of the stand taken against government ownership and operation of power plants, the report has been made the subject of some editorial controversy in the Northwest. Criticism has emanated principally from that group of Oregon citizens and newspapers that has been advocating development by the government of the Umatilla Rapids irrigation project with power development as a side issue, and seems to have been actuated specifically by the report's endorsement of the Priest Rapids project as coinciding with the principles embodied in its conclusions, while all mention of the Umatilla Rapids project was omitted. Incidentally, the Umatilla Rapids project has been declared by Elwood Mead, director-general of the Reclamation Service, as being "not feasible under present conditions, * * * and that it must await the growth of much more extensive opportunities for the utilization of its out-

put (of electrical energy) than exists at the present time." What has been advocated by Dr. Mead as a condition upon which a specific project should be contingent is advocated by the City Club report as a general principle to govern all such projects on the river.

Without attempting to enter further into the merits of this controversy, we aver that there is a deal of straight thinking and sound logic in the conclusions of the City Club report, and that the data presented, on which are based these conclusions, make the report a valuable contribution to the technical literature about the Columbia River and the territory contiguous to it.

Utility Service and the Santa Barbara Earthquake

THE spirit of public service as exemplified by the light and power industry today was ably demonstrated at the time of the recent earthquake in Santa Barbara, once through the personal act of an employee and again when the facilities of an entire company were placed at the disposal of the stricken city.

In times of great danger or excitement most humans are actuated by an impulse of self-preservation. At the time of the earthquake, N. E. Engle, operator on duty at the Santa Barbara substation of the Southern California Edison Company, thought not of himself, but of the lives and safety of the many people in the city served by his company. Partly stunned from falling mortar, his first thought was of broken wires, short circuits and damage by fire or loss of life. He remained in the wrecked substation long enough to open the circuit breakers and completely de-energize the lines in the city. So has the spirit of service seen inculcated into the very lives of public utility employees.

Then again, within a very few hours after the shock occurred, hundreds of Edison employees, with fire trucks, tools and machinery were on hand to clear away the wreckage and once more establish service. By nightfall, street lights were burning in the area of greatest damage. Street car service was restored shortly thereafter. Work was well under way on the construction of a new substation to serve the city in place of the old one which had been wrecked.

Thoughtful and unselfish acts of this nature are the kind which proclaim to the public the fact that true service is the keynote of the electric light and power industry and its employees.

Accident Prevention Presents Challenge

CURIOSITY or thoughtlessness has led many a child to painful injury or an untimely death through contact with electric transmission or distribution lines. Scarcely a day passes that does not bring word of a new case. In addition to the needless sacrifice of youthful human life is the property and service damage suffered by the utility company upon whose lines the accident occurs.

Ample reason there is, therefore, for the serious consideration of further preventive measures. Steps have been eliminated from the lower extremities of most wood poles on distribution lines and from all poles on transmission lines of the higher voltages; danger signs have been placed (and serve well as targets for both malicious and brainless vandals); high-tension tower lines are located in comparatively inaccessible places; and other conscientious efforts have been made to eliminate the hazards of persons coming into contact with conductors. Nevertheless, this type of accident continues and shows an alarming percentage involving minors.

A program of education along adequate lines is obviously the most effective way to combat the thoughtless tendencies of youth. The logical place to reach this class is in the school. Wide-awake school authorities doubtlessly would fully cooperate with power-company representatives in a campaign of education among pupils. Not a "bugaboo" program nor a program entirely of "don't's," but one of simple and vital information would be the most effective.

Children admittedly are impressionable. Even the youngest in attendance at the public schools would not fail to recognize the intent of a colorful poster depicting the disastrous results of an electrical accident. For the older children and the high-school students an occasional talk by a qualified person to supplement bulletin-board posters would serve well.

Whatever the details might be, the existing situation presents a challenge.

Tracy E. Bibbins in Memoriam

IN the passing of Tracy E. Bibbins, the electrical industry of the West has lost one of the pillars upon which it was founded. Of the very brawn and sinew of the pioneers, Mr. Bibbins was born in San Francisco, educated in the public schools, and at an early age was compelled by the vicissitudes of the family fortunes to go out into the world on his own initiative and hustle for a living.

In spite of a situation that would have daunted most youngsters, he went to work with a vigor and determination that has characterized him ever since. He dug post holes; he would tackle anything, and the year 1889 found him building electric railways in Oregon. From then on, his advance was rapid. Promotion followed promotion, and each successive job found him ready for greater and greater responsibilities.

He was fortunate in his early environment. Coming of a long line of cultured, scholarly people, his mental processes were orderly, thorough, and sound, so the lack of a formal education as it is called today did not militate against Mr. Bibbins making of himself a gentleman of education and refinement, hiding under a certain reticence a warm feeling of human kindness for those with whom he came in contact.

Materially, as the world judges such things, he was a successful man. But more than that was the fine spirit of loyalty that he engendered in those who

served under him, a consequence of the force of example that he set to his associates. In this lies the best monument that could be erected to his memory.

DISCUSSION

The Hen or the Egg?

To the Editor:

Sir: It isn't heard very much any more, that old argument as to which will survive, gas or electricity. Both seem to be healthy and have good prospects of survival for some years to come. But it does not take a long memory to recall those early days when the infant electricity loomed as a child that would do its predecessor out of its job, much as every mechanical development in the world has loomed as a dire threat to take the place of mankind and eliminate it.

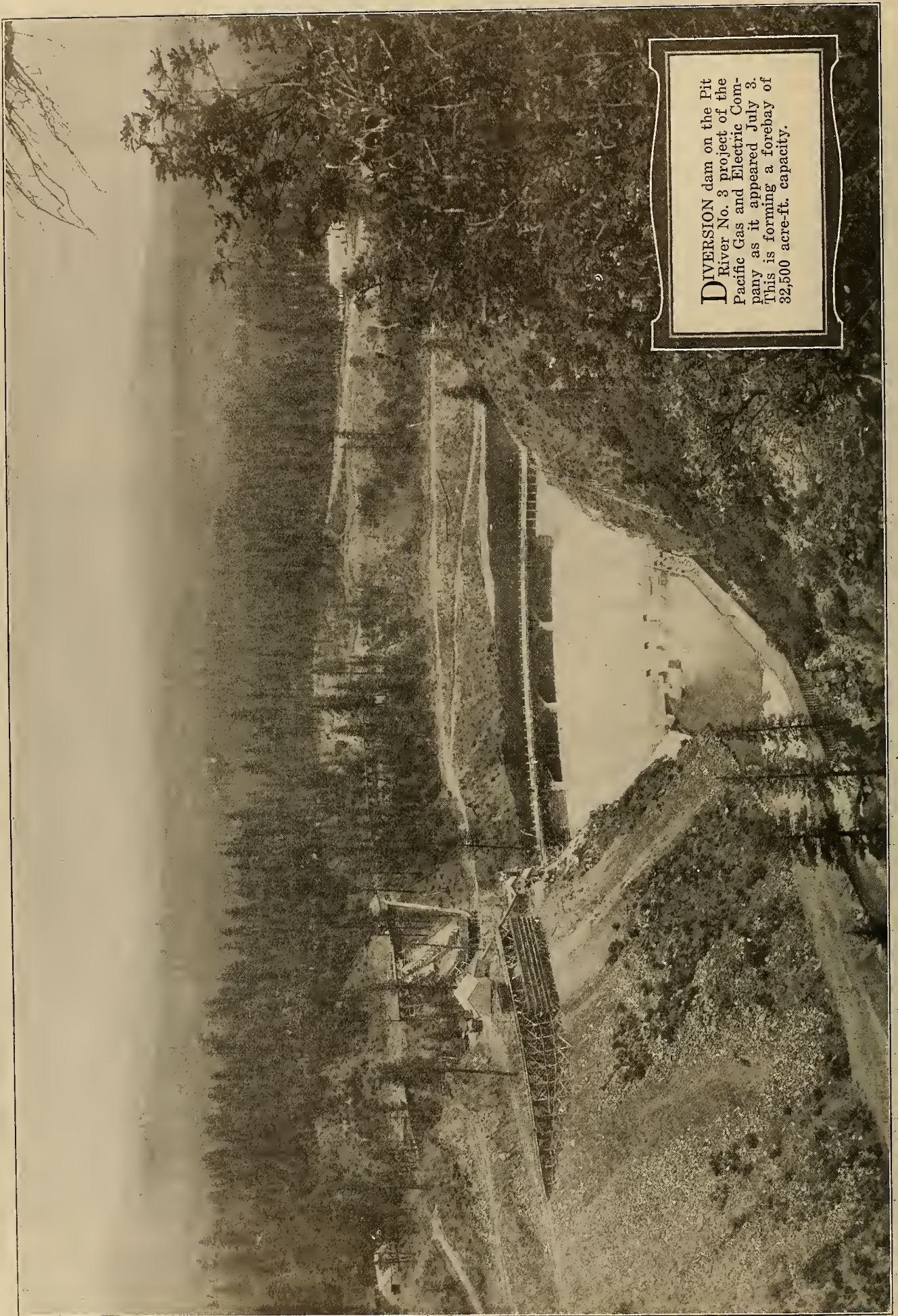
The situation is repeated in every phase of human activity, though, and will continue as long as inventive or creative minds launch new departures from established ways. One viewed with alarm the advent of the movies, for they were to destroy the speaking stage. The speaking stage has survived exceptionally well and has learned much from its younger rival, particularly as to its own limitations. It has sought to develop along lines entirely its own, as a consequence of competition, and now does things no movie can do.

The same has been true between the old rivals, electricity and gas. The gas business has given up what it could do only second best, viz. lighting, and has concentrated its efforts on what it could do exceptionally well—heating. One finds today that gas heat enters into the manufacture of all manners of units of electrical equipment, from the making of millions of light bulbs to the casting of large pieces of machinery. And on the other hand, one finds that electricity has just entered the field of gas-making, not merely as a by-product of gas plant operation, but to play the gas-maker itself, or to meter and record the production of the gas-making machines.

Nothing really supplants altogether anything that is established, at least not for long. The wildest dreams of inventors that such and such an apparatus or idea will junk all that has come before, never have been realized to the fullest extent. Just as a community seems to benefit by the fact of competition between the vendors of the commodities it needs, so with mechanical advancement. Each new feature comes, stirs up the old to new activity, and then in the succeeding seasons finds its legitimate place in society and the pond becomes smooth again.

It is hardly worth bothering over the problem of which was the first, the hen or the egg, so long as we have both—hens for Sunday dinners and eggs for breakfast.

W. A. Cyr,
San Diego Consolidated
Gas & Electric Company
San Diego, Calif.



DIVERSION dam on the Pit River No. 3 project of the Pacific Gas and Electric Company as it appeared July 3. This is forming a forebay of 32,500 acre-ft. capacity.

State Versus Federal Regulation

By Herbert C. Hoover*

Secretary of Commerce

WE are in the midst of a great transformation in the development of electrical power—it amounts almost to an industrial revolution, for it bears upon its wings the most profound advance of American industry in a generation. It is reducing the burden of human toil, it is increasing productivity, it is bringing increased comfort to our people—and it has raised some new questions in relation to governmental regulation. Among these are proposals to impose federal over state regulation of the electrical utilities.

I have been requested by your managers to speak before this great body of men engaged in this industry upon these public relations and I therefore propose to shortly review the great transformation in progress in order to better illuminate the working of the present safeguards to public interest and the shifts needed to meet new conditions. And I wish your indulgence for a few remarks “upon the responsibility of the industry to the public.”

I do not propose to refer to this evolution as either “superpower” or “giant power.” Both these terms are blamed with connoting something that is not existent in power production. “Super” power has been envisaged as some overwhelming sinister encroachment into public rights. “Giant” power has been interpreted by extremists to be like any giant hitherto known, as having its only realism as a bogey or as entertainment for children or as a side show for the political circus. The practical everyday fact is that all this development is simply a centralization of power houses and interconnection of distribution systems. We had better stick to our engineering terms to describe what the thing really is—central generation and interconnection of distribution systems. If anybody can find evil or humor or poetry in these terms, he will need to be ingenious.

I scarcely need repeat that all this great evolution starts from the scientific discovery of long distance power transmission. From it have sprung a long train of consequences truly startling in their effect.

It has made possible great economies in steam generation through huge central units; it has made possible the wide diffusion of the great water powers.

Central generating plants bring great savings of capital investment through decrease in amount of reserve adjuncts to a multitude of individual plants, and an increased use of generator capacity by combining the high night load for town lighting with the day load of industry and generally a wider diversification of use. Beyond this, by interconnection between different regions even greater security and better load factors are secured. Water power resources are expanded for it is now possible to harness the flood flow of streams and to substitute it for steam power during the high water season. All this means not only cheaper operation but greater security of supply and enormous expansion in the application of electricity to much wider purposes.

Thus the lines of our power systems cross rivers and deserts, traverse fertile valleys and wooded hills and climb the passes in high mountains. They enable you to bear the burden of the great white ways by night and of the coal mines by day—they yield to you the rainfall of the North when drought has parched the South. You deliver your energy with the same delicacy of feeling to the dentist's hammer and the boiler maker, and you relieve a lot of human sweat. Our people now substitute for muscle an average of 3,300 kw-hr. per year per family instead of 250 kw-hr. but ten years ago—although they mostly do not know what a kilowatt-hour is, but they know what it can do.

Generation and Interconnection

We are well along the road in this evolution to central generation and interconnection. It is moving silently but stupendously before our very eyes. It is probably one-third complete. It is marked by movement in four directions. The first is the erection of highly efficient central generating stations of enormous size; second, the consolidation of town plants to form district power systems, supplied from these central stations; third, the interconnection of district systems for the transfer of power between them to balance demands of one system as against the other; and fourth, transmitted power is rapidly replacing individual steam engines and local electric generators.

At the beginning of this young century the greatest generation of power under one roof was less than 10,000 hp. Today we talk complacently about the



HERBERT C. HOOVER

who is convinced that the best interests of the public are served when the ownership, control and regulation of electric utilities are within the districts of operation. In Secretary Hoover's opinion the state bodies are adequate to control the situation and there is no need for federal regulation

*An address delivered before the 43rd convention of the National Electric Light Association, San Francisco, June 17, 1925

extension of a certain plant to 1,000,000 hp. radiating from one building. And that particular infant weighed only 750 hp. when it was born thirty-seven years ago.

Twenty-five years ago we had but one station exceeding 5,000 hp. Today we have at least 500 stations of over 100,000 hp. Central generation has made possible the big single generator, and today a single machine of 100,000 hp. is in construction. In the last five years only we have increased the total central station capacity from 13,000,000 hp. to nearly 20,000,000 hp.—almost 58 per cent. Of the increase, hydroelectric shows a rise from 8,000,000 to 9,000,000 hp. The central stations now produce more power than all the steam engines and other power produced in the country combined, outside of transportation. During the last five years the power generated at the factory and shop has actually diminished. The volume of purchased power has increased from 31 per cent to 40 per cent in this period.

It is only natural. The ability to secure power for instant delivery and for the actual moments in which it is used instead of maintaining boilers under steam for all hours, together with the far greater fuel efficiency of the central plants, are causes enough. The best central plants are today consuming only $1\frac{1}{2}$ lb. of coal as against 10 or 12 lb. per kw-hr. of effective power in the little plants. In central steam plants we have in the last five years alone seen a reduction of coal consumed per kw-hr. from 3.26 lb. to 2.2 lb., or a saving of over 19,000,000 tons.

Concurrent with the expansion of central generation has been the evolution of the power district as distinguished from the individual town system. The outlines of these regional power districts have emerged in probably 50 per cent of the important power consuming areas of the country.

The wider interconnection between these regional systems also is proceeding apace. For this again makes use of the power capacity below the peak load by an interstate diversification. Such a flow of electricity will soon be traceable through the many regional systems continuously from Montana west to the Pacific, thence south to Mexico—a total of 1,800 miles. Shortly, power tie-ins will be completed in the Middle West and Southeastern areas, coursing all the way from Wisconsin and Michigan around through West Virginia and North Carolina to Arkansas and Louisiana. Incidentally, we have evolved a new profession—the power dispatcher, who determines which plants shall generate and at what times, hour by hour.

And it is not amiss to say something of the probable future expansion. A still larger amount of the horsepower produced in local factories will be displaced by purchase from central stations. We are just entering the stage of electrification of transportation. Present users will increase their requirements, new uses will be discovered. The power district as distinguished from the town system is making possible the expansion of service to the farms. At our present rate of increased requirements, by 1930 central stations for the country will probably

need an additional capacity of fully 30 per cent carrying them up to nearly 36,000,000 hp. Probably \$5,000,000,000 of additional investment will be required.

The most of this increase will be supplied by steam generation. The public is generally under some illusion as to our water power resources. In the districts east of the Mississippi, where 75 per cent of our power of all kinds is generated today, if every drop of water that is economically useful were actually harnessed, these projects could supply less than 15 per cent of the requirements.

The Public Interest

There is some anxiety in the public mind as to whether public interest is or will be adequately protected in this great transformation. We must face the fact that in order for these economies to be brought about, the power industry evolves from a single town enterprise to large district enterprises. These fundamental changes have necessitated the raising of vast sums—now nearly \$1,000,000,000 per annum. The technology of central generation and interconnection, requires that the business must grow in the size of capital necessary for great power houses and district systems if we would have the benefits of low price power. We cannot buy 100,000-hp. generators at a 10-cent store. It implies vast consolidations, and a large number of intricate cross contracts, enormous commercial transactions and great security issues.

That the public has a definite right and interest in these transactions is no longer a matter of dispute. We have throughout the nation, by the 48 states acting independently, definitely abandoned the notion of compelling competition in electrical service as a method of holding down rates and holding up service. The states have in effect conferred definite territorial monopolies in order to avoid the fabulous duplication of equipment, investment, financial instability, operating expenses and cost to consumer that would be required to maintain competition to every householder and every factory. And when we deliberately clothe an industry with the habiliments of a monopoly, neither the industry nor the public any longer disputes the necessity of full control of rates, profits, service and finance by governmental regulation.

The real issue in this question is whether states, through their regulative powers, are already in control of the situation for the public interest.

The anxiety in the public mind over these charges is inherited from the bitter chapter of exploitation when the railroads went through a similar era of expansion, consolidation, and interconnection. No one can review that period of wild finance, plunder and corruption in transportation with any feeling of national pride or satisfaction. Things were done that never should have been done, and in reaction the public forced legislation which stifled development of American railways for years, and in the end imposed penalties in the way of inadequate facilities upon the people themselves. The railways came under regulation subsequent to their great era of trans-

formation and exploitation. Thus there is a very positive difference in the stage setting in this transformation of the electrical industry as compared with that which took place in transportation a generation ago. The electrical utilities have been under regulation practically from the day they were born and they are under regulation through practically the whole country today. Moreover, not only is public opinion far more alert because of its memories, but due to the local and regional character of the electrical industry its essential economies are comprehended much better by the public and can be dealt with locally and with full understanding, which is not possible in the vast railway systems whose interests were spread over great numbers of states instead of local communities. Beyond this the majority of the men who dominate and control the electrical utilities themselves belong to a new school of public understanding as to the responsibilities of big business to the people. The industry does not resent constant inquiry and constant public concern for public interest. Glass pockets are the safety of the industry as well as the public.

The Effectiveness of State Regulation

During the past year the Department of Commerce has been engaged upon a study into the effectiveness and the results of state regulation of the industry. Few people seem to realize the fullness, the extent and the authority of the regulation now in effect. It is scarcely necessary for me to say that there is either state or municipal regulation of the rates of electrical utilities in all but two of the states and of service in all but five of the states. The financial operations of such utilities are supervised and controlled in a large majority of the states. These principles are being rapidly extended over the few remaining states.

No one can survey the work of the state commissions and the instructive series of court decisions concerning their rulings as a whole without realizing that we are gradually developing a science of regulation and of understanding on one hand of the means of drawing the fine line between minimum rates to the people and on the other hand of such a reasonable profit to the industry as will stimulate its advancement. It is my belief from this investigation that the public service commissions with very little just criticism are proving themselves fully adequate to control the situation. The laws as written in the state statute books are sufficient to protect both the public and the industry, the two parties to the utility contract.

But the test of regulation does not lie in the statutes. To know whether regulation has really worked to public interest we must examine its actual results. We have now behind us a score of years of regulation and we can judge by real experience whether this method will protect public interest.

It seems to me that there are two final tests of this question. The first is: Is the service adequate and is the industry progressive in its provision for future need? The second is: Are the rates reason-

able in themselves and are the profits taken by the industry upon the capital invested extortionate?

I need add nothing to what I have stated already as to the development of the industry to demonstrate that the advancement of the art and its progress in application are moving apace. In the national sense the industry is acquitting itself well in service. Its initiative in scientific investigation, in application of discovery, its extension of service, is of the highest order of American business. The service leads all others in the world and it improves every year.

As to the reasonableness of rates, it may be observed that the nation-wide average shows that rates are today slightly below pre-war, and this despite an increase of 100 per cent in wages, together with increased cost of fuel and of many supplies. Power is one of the few commodities which the public obtains at pre-war prices. While the price per kilowatt-hour has shown a small decline since before the war, yet beyond this the technical improvement in lamps has resulted in fourfold increase in the amount of light dispensed for the same money. Of perhaps broader significance in this test is the fact that the total interest and dividends paid by the industry in 1912 amounted to under 4 per cent on the estimated valuation of the industry; in 1917 it was under 5 per cent and in 1922 it was under 6 per cent and again about 6 per cent in 1924. It might be observed that the rate of taxation on private plants increased about 400 per cent, that is, from about 0.6 per cent on the estimated valuation in 1912 to 2 per cent in 1924.

It does seem to me that these facts demonstrate that in the nation-wide sense our state legislatures have been equal to their task of protecting the public and that the state commissions are doing their jobs well. And likewise, democracy is demonstrating its ability to retain mastership in its own house.

Federal Regulation

It has been proposed that as power districts may be no respectors of state lines, we must have federal regulation of power. I do not agree with the conclusion that federal regulation is necessary. I can see no reason for the imposition of a superior regulation, merely because Congress may have the power to exercise its authority under the commerce clause. The essence of regulation lies in a tight grip on the concern that actually deals with the consumer. There is the possibility that generating concerns may sell their power wholesale at the state line to distributing companies, thus attempting to make their wholesale prices exempt from the regulation of the consuming state. But that state still regulates the price and service of the distributing company. Most commissions exercise supervision of the contracts for purchase of power. The commissions are unlikely to accept blindly as an item of cost the amount paid to an external transmission company for its power, but rather they will examine the cost and reject it as a basic element if found unfair or excessive or collusive. I commend this view to the careful consideration of the state commissions. The utilities

themselves would do well not to oppose it. It would fill the only gap open for federal intervention. For the rest cooperation between commissions could settle the possible minor questions.

And there are the most weighty of reasons against federal regulation. Power is, by necessity, bound to be local in its districts—as to its service, its generation and distribution. It differs widely from the interstate implications of the railways where they are dependent not upon districts but upon whole groups of states. Local acquaintance, local valuation and public opinion can operate upon power to their fullest extent. Nothing will produce worse service than to attempt to transfer local problems to absentee solution at Washington. And if our democracy will stand at all it must stand upon the local responsibility. Nothing could be a more hideous extension of centralization in the federal government than to thus undermine the state utility commissions and state responsibilities.

New Problems in Public Relations

Central generation and interconnection do not in any way alter the essential character of regulation. There are, however, questions of public relationship which become of greater importance as a result of this transformation of industry, and I propose to review a few of them.

The most difficult of all questions before the commissions has been the determination of the basis and method of valuation of the properties for rate making purposes. There have been many theories and much discussion. But one element is common to all methods, and is the most important in the public interest; this is, that the rate of earning and consequent charge to consumers, is based upon reasonable return on actual value. The commissions, broadly speaking, have disassociated capitalization, as shown by stocks and bonds, from the valuation on which rates are to be based. The consumer is thus free from the burden of over-capitalization. The commissions have reached realities in the matter, casting aside all arguments based on watered stock. And through their control of security issues, they are in a position to prevent over-capitalization in the operating companies.

In most communities basic valuations have already been determined. It is greatly in the public interest that valuations be completed and made universal. By prompt commission action now we can avoid the forty years of delays and muddling we have gone through in the attempts to value the railways. And there is sound protection to the investor in this basis of rate making, for it holds capital issues to realities. It would be a further protection to the investor if all companies published to their stockholders the valuation of their properties by the public commissions.

Regulation of Municipally Owned Plants

The municipally owned plants in the country comprise about 31½ per cent of our total generating capacity. In approximately half of the states municipi-

ally owned plants are immune from state regulation of their rates and service. In many cases they neither maintain uniform accounting systems nor submit their accounts to state commissions.

It is vital to the local communities which have such plants that they should be able to judge the competency of their managers and the relative advantages of private versus municipal operation by comparison of results. Beyond this, however, as municipal ownership is much recommended to the nation by its advocates, it is of the highest importance that the whole nation should be able to form unbiased judgment in the matter by the parallels of actual experience. Whether the cities will secure their power and light from the great interconnected systems of private enterprise at regulated rates and profits, or will undertake to secure it by municipal ownership, will be settled only by experiment and the experiments are in progress. We make progress in democracy only by experiment. My point is not to argue the municipal ownership question which is often a problem of local factors but to emphasize the importance from a national point of view that the whole country should have available real knowledge of how these experiments result. Moreover, the best assurance to the citizen of those cities is the independent check on accounting service and finance by the state commissions.

We shall sooner or later have difficult questions to solve in connection with the relationship of by-product power from federal construction of dams for flood control, reclamation and navigation such as Muscle Shoals, the Colorado and St. Lawrence Rivers, and we should solve them solely on engineering principles.

Free Flow of Power Across State Boundaries

The free flow of power across state boundaries has become a question of importance because of the embargoes upon the export of hydroelectric power imposed by some states. There may possibly be cases in which the export of power from a state, if fixed for all time, might stifle its own progress. They are very unlikely. The free flow of power through economic districts is as vital to efficient national development as is free interstate transportation in the case of the railroads. These embargoes are of doubtful constitutionality, but of more importance it well may be doubted whether such policies will work out in the end for the interest of the originating state itself.

Advancement of Central Generation

Such actions are most unlikely to result in perpetuating more costly power to the originating state. The whole development of the industry indicates that the most economical use of water power must be in combination with large central steam plants, otherwise the secondary power cannot be developed nor can the full load of primary power be made useful. Thus a district pooling of production and distribution is necessary if hydro is to be cheaply developed and used. Beyond this, power will always retreat to the

shortest transmission for equal rates and hydro states will get their power when they need it.

A vastly important matter from a public point of view is that central generating stations and district distributing systems shall be erected upon the most soundly economic foundations for future service to the public. In this there should be immediate cooperation between the state utility commissions and the industry. The resources and the demand of every state and group of states should be subjected to critical study. The development of our streams on a designed program that will give the maximum ultimate power by equating the flow to the maximum degree is imperative. In skimming off the cream by haphazard development we may render full development an impossibility.

Again, location of central steam plants in their relation to fuel and water for cooling and to distance of transmission should be placed under analysis. I commend this to the commissions, the engineering professions, and to your association as an urgent opportunity for cooperation for our best development.

Obligations of the Industry

Public policy has not alone limited profits in the industry but it has given privileges and has, as a direct consequence of regulated rates, given protection to stable returns to the industry. There is therefore in this relationship a tangible obligation of rendering a wide-visioned service to the public in return. A great majority of the industry accepts this with the full sense of its importance.

The first obligation of the industry is service and in the light of these great inventions service now requires the full equipment of the country with central generation and interconnection. It is one of the greatest obligations ever imposed upon a single industry. Nor would the country be best served by pell mell haphazard treatment of the question.

The installation of these gigantic equipments for the least capital expenditure in such locations and in such fashions as will give the maximum efficiency not only today but in the long view, is vital. As I have said, I believe the industries should cooperate with the public utility commissions to study the long view of state and regional development. It all involves almost infinitely painstaking technical studies and development of actual construction step by step.

Industry now also must assume the burden of the development of service to territories beyond the congested districts. Such service upon efficient and low rate basis will bring long view returns of the greatest value to the industry and the community. Your association has already taken steps in promoting electrification of our farms and rural communities. It is desirable that the operating companies should take note of this development in California which already exceeds any other place in the world in this respect.

One phase of the whole question of ownership and control is being worked out through your distribu-

tion of prior lien stocks to your employees and consumers. With the increase in stockholders of this industry from 600,000 persons to 2,500,000 persons in five years, you are creating real popular ownership. I am convinced that in the long run the industry should be local, not only in its ownership but in full control within the district of its operation. It is a vital part of the community organism. This may be partly unattainable in the period when outside capital is required, but the ultimate safety of the industry and the public lies in this direction.

In closing I should like to repeat a statement which I recently made, for it bears upon this industry. I said:

"Perhaps dimly, but no less certainly, there is looming up in the American industrial world a definitely new relationship in the whole setting of industry. The capital ownership of great service and production is rapidly being diffused among millions of individuals. The ownership is thereby being divorced from management. The managers of older and settled industry are today rising out of the skill of the industry itself. And they are gradually coming into a new vision of their relationships. Those relationships have a tripartite responsibility; to the consumer on the one hand, to the worker on another, and a regard for capital only in the sense that it shall be assured security and this secured on the lowest terms in the market. Under this regime the savings we can make through application of invention, through increase in skill, through elimination of collective waste, are bound to be shared with the consumer to attract business, to be shared with labor to secure service and contentment, and to be decreasingly shared with capital, because capital comes cheaper with increasing security.

"If we examine our utilities and many of our older and larger manufacturing concerns from this point of view, we shall find that an astonishing proportion of our national production and service is now operating in various degrees under this regime of a new conception of capital, management, labor and the consumer. Thirty years ago we should not have believed this possible. Nor are these tendencies based upon any abandonment of self-interest as a motive. They are based on just a little more intelligent self-interest, with perhaps a little larger proportion of that salt of altruism found in the impulse to personal accomplishment and in responsibility to widespread numbers—and to public opinion.

"He would be a rash man who would state that we are entering finally the industrial millenium, but there is a great ray of hope that America is finding herself in the road to a solution of the greatest of all her problems; that is, a method by which social satisfaction is to be attained with the preservation of private industry, of initiative, and full development of the individual."

The electrical industries may through their methods of organization be the bearers of a new gift to sorely tried men, greater even than the energy they supply.

Logging Electrically

By R. E. Gray*

Electrical Engineer, Snoqualmie Falls Lumber Company, Snoqualmie Falls, Wash.

A LONG the Pacific Slope, and in Idaho, Montana and British Columbia logging is a term as well understood as rail-roading or shipping. Under this general heading are included all of the activities connected with falling the trees in the forests, sawing them into suitable lengths and transporting them to the mills to be manufactured into lumber.

Insofar as the falling of the trees and cutting them into lengths is concerned practically the same methods are used by all loggers. This is hand work in which men working in pairs with axes and saws cut the trees down, after which one man

saws them into lengths varying from 24 to 40 ft., according to the kind of timber cut and the facilities of the mill in which they are to be manufactured into lumber. From this time on in the process of getting the logs out to a railroad where they are loaded for shipment, power machinery is used. Space does not permit of a description of the many different methods nor of the different kinds of machines used in this process, nor is it necessary to the purpose of this article, which is to show that electricity can be used successfully for power. It will be necessary to acquaint the reader only with the general problem involved before proceeding to a description of an electric installation.

Development of Logging Methods

In the early days, the gathering of the logs, which is called yarding, to some vantage point for transporting them out of the woods, was done by horses or oxen. Then about thirty years ago the steam engine came into use. The first machines were small donkey engines equipped with a spool or nigger head around which a line was wrapped and fed on and off by hand when the log was pulled in or the empty line pulled out again. The empty line was pulled out by a horse. It has been a big step from this beginning to the modern logging machine capable of handling logs, weighing many tons, at a rate of nearly 1,000 ft. per minute and returning the empty line at 2,000 ft. per minute.

Modern logging machinery has been built up to its present efficiency using steam exclusively for power.

UNTIL seven years ago when the Snoqualmie Falls Lumber Company commenced to experiment with electrically driven logging machinery, it was impracticable if not impossible to log successfully using electricity for power. Now, after the pioneering work done by this company has demonstrated the practicability of this application of electricity, other operators have installed electric machinery and this new use of electric power in industry is increasing. In this article, Mr. Gray describes the early experiments made by his company and the complete electrification later of its entire logging operations.

Ordinarily the same manufacturer produces all the equipment including the engine, although it is not the opinion of the writer that this fact has retarded the use of electric motors in the woods for more than a few years at most. The extremely high comparative cost of the electrically driven machine and the lack of available power are perhaps the chief reasons that only in the last five years has electricity been used for power in the woods. It is true that only in two states, Washington and California, is there any use whatever of this motive power, and there only by the large operators. It is

also true that electricity represents an insignificant percentage of all the power used in the logging industry of these states. However, the connected load of electric logging equipment now exceeds 10,000 kw., and this fact is significant when it is remembered that this load has been developed in the last five years.

The turning point toward electric drive came in 1920 with the termination of successful pioneering by the Snoqualmie Falls Lumber Company, Snoqualmie Falls, Wash. Electric logging, as it is called, is of such recent date that no great difference has been developed by the manufacturers in machines used for the same purpose, and due to the fact that at present all companies engaged in electric logging are using practically the same methods and machinery, it is possible to get a fair idea of the operation by a brief description of the methods and machines used by the Snoqualmie Falls Company.

Logging at Snoqualmie Falls

In 1918 this company had completed a lumber manufacturing plant consisting of two saw mills and a planing mill with a capacity of nearly 500,000 board feet per eight-hour shift. A tract of standing timber near the mills sufficient for at least thirty years' operation furnished the raw material for the plant. Two logging camps were established and equipped with steam driven machines, which were, as will be shown later, supplanted by electrically driven machines. The method of logging used is the well-known "high lead" system.

In this method two machines are used, one called a yarder to gather or haul the logs to a pile along-

* Paper read before the second annual general meeting of the Technical Section, Northwest Electric Light and Power Association, Spokane, April 16, 1925.

side of the railroad, and one called a loader used to pick the logs up from this point and load them on cars to be shipped out to the mill. A yarder and loader working together constitute what is known as a "side," and the size of the camp is designated by the number of "sides" in operation. A series of parallel railway spurs, extending through the timber about 1,000 ft. apart, lead out through a main spur to make-up tracks or sidings placed conveniently for assembling both the empty and loaded cars.

The yarder and loader are essentially hoisting machines. The yarder has three drums any one of which can be operated independently of the others. On the main drum is wound the main line used for pulling in the logs. This line, $1\frac{1}{2}$ in. in diameter, is



"Thomas Edison," the first successful electric yarder which was put in service in 1918. The author, who was largely responsible for the electrification of the Snoqualmie company's logging operations, is in the foreground

standard plow steel hoisting rope with wire rope center having a maximum tensile strength of 166 tons, and a proper working load capacity of 33 tons. The second drum is called the haulback drum on which is wound a smaller line, $\frac{3}{4}$ to 1 in. in diameter, but of the same material as the main line. This line is used to pull the main line out again after a log has been hauled in. The third drum is used to carry a still smaller line, $\frac{3}{8}$ in. in diameter, which is pulled out by hand and used to move the heavier lines as changes in working locations become necessary.

The loader consists of two hoisting machines with two cable drums each, either of which can be operated independently of the other. One drum on each hoist carries a line used to lift the log onto the cars. Of the two remaining drums on each machine, one carries a line used to pull empty cars into position for loading, and the other carries a small $\frac{3}{8}$ -in. line used mostly to hoist a man up the spar tree to make repairs and changes in the rigging.

Use of the Spar Tree in the "High Lead" System

The spar tree for "high lead" logging is simply a big tree left standing alongside of the railroad, trimmed and topped for use as a mast to support the rigging incidental to the yarder and loader. Sound fir trees, 175 to 225 ft. high and 6 to 10 ft. in diameter at the base, are selected for this purpose. Twelve guy cables of wire rope, six near the top and six about half way up, are placed to hold the tree against the pull of the lines. Two pulley blocks are fastened near the top of the tree below the upper guys. One,

about 36 in. in diameter and weighing nearly two tons, is used to pass the main line through, and the other, a much smaller one, is used for the haulback. A third pulley block is then fastened to a stump just outside the area from which the logs are to be hauled.

The small $\frac{3}{8}$ -in. line on the third drum of the yarder is now pulled out by hand, threaded through this third pulley block, and carried back to the spar tree where it is used to pull the haulback line out and through this third block. The main line is then pulled up the tree, threaded through the large block, and brought back to the ground where it is fastened to the haulback line, making a continuous loop capable of being operated in either direction. A piece of slightly smaller line, 10 or 12 ft. in length with a heavy steel hook on the outer end, is fastened to the main line at the juncture of the main line and haulback, something like a leader on a fish hook. This is called a choker and is used to hitch the main line onto the log, which is done by passing it around the log and hooking it onto itself. The reason for running the lines up through the blocks high up on the spar tree is to keep the lines clear and also to raise slightly the front end of the oncoming log preventing it from digging into the ground and being caught on stumps.

From the practice of using a high spar tree this method has derived the name of the "high lead" system, and without a doubt it is the most productive method known of gathering logs where a railroad can be run in within yarding distance. Since experience has taught that it is not economical to use a "high lead" to yard over about 700 ft., it is necessary to locate the railroads about 1,000 ft. apart, and the spar trees 1,000 ft. apart along the railroads. This arrangement puts the spar tree with the logging machines in the center of an area 1,000 ft. square—500 ft. in each direction at right angles to the track, by 1,000 ft. parallel to the track. Since the yarder pulls in the logs from all directions it will be readily seen that the maximum distance the logs are yarded is about 700 ft. from the corners of the square. Where the lay of the land makes the cost of building a railroad in to a spar tree prohibitive, a yarder is pulled out from the nearest railroad, rigged up to a spar tree so as to yard the logs into a pile from which they are re-yarded on to the railroad for loading out. Such a spar tree is called a "swing tree," and reference will be made to one later.

The loading lines are threaded through pulley blocks called loading jacks, suspended about 20 ft. apart from the guy lines on the spar tree directly over and about 40 ft. above the track. Immense steel tongs, like ice tongs, are secured to the ends of the loading lines to grip the logs for raising them on to the cars. The cars used are essentially flat cars with a raised shoulder or bunk near either end on which the logs rest.

Experiments with Electric Machinery

It may be said that a lumber manufacturer can have all the fuel needed to generate power for the operation of his plant for the cost of transporting it from the mill to the boiler room. This chance to

economize led to the experiment with an electrically driven yarder. The move was made purely for economy and no idea of any more than equaling the performance of the steam driven machines was entertained. One of these machines was tried out in 1918 and 1919 surpassing the output of the 11 x 13-in. steam yarders, and in fact almost equaling that of the 12 x 14-in., the largest steam yarders. This showing gave impetus to the trial and, since a complete "side" includes both a yarder and loader, an electric loader was procured in 1920 and put to work with the yarder. These machines were operated and observed for a few months and formed the basis of the specifications for the machines now in operation.

A survey was made of the generating capacity of the power plant, and it was found to be sufficient to electrify the entire woods operation, although later additions in the mills made it necessary since to tie in with the Puget Sound Power & Light Company. With power available, and in the light of the experience gained in the experiment, it was decided to proceed with the electrification of the woods, and seven yarders and six loaders were purchased.

Distribution and Control Equipment

Three single phase, 833-kva., 22,000/600-volt, 60-cycle, oil cooled, outdoor transformers, with 5 and 10 per cent taps on the low voltage side, are used to step the generation voltage of 600 up to the distribution voltage of 22,000. Eight 450-kva., three-phase, 60-cycle, oil cooled, outdoor transformers, 22,000/600 volts, with 2½, 5, 7½, and 10 per cent taps on the high voltage side are used in the woods to step the line voltage down to 600. These transformers are used one with each "side," and are mounted on sleds as they have to be moved about once a month. A 50-amp. triple pole, single throw, 22,000-volt, outdoor, fused disconnecting switch is mounted on the transformer sled to disconnect the transformer from the line, as are also suitable lightning arresters. These protective devices have proven wise provisions.

Five thousand feet of three conductor, No. 4/0 armored cable were purchased to connect the yarding and loading motors to the 450-kva. transformers. This cable is in 500 and 250-ft. lengths, as it is thought that 500 ft. is about as close as safety permits the high voltage line to be brought to the operation. Twenty-four 300-amp., single pole, single throw, disconnecting switches are installed for the purpose of sectionalizing the power line in the woods. The equipment without mounting cost nearly a quarter of a million dollars.

The Yarder

The yarder equipment consists of a three-phase, 60-cycle, 550-volt, 300-hp., slip ring motor with full magnetic control operated by a master switch. The maximum torque capacity of the motor is 425 per cent of its rating. The motor is equipped with a solenoid brake which drags when the controller is in the first position producing a creeping speed on the main line, which is necessary to give the men a chance to get out of the way when the choker is being tightened on the log. Incorporated in the control sys-

tem is a current limiting device, the adjustment of which is such that the pull on the main line may be limited to any pull between 50,000 and 70,000 lb. Inverse time limit overload relays protect the motor from a locked rotor current condition.

In addition to the speed variation gained electrically, a gear change arrangement, operated by com-



One of the electrically operated "sides" used by the Snoqualmie Falls Lumber Company. This is the first 2-speed unit ever built

pressed air, produces a slow speed of 350 ft. per minute and a high speed of 800 ft. per minute on the main line. The speed of the haulback line is 2,000 ft. per minute, which is the rate of travel of the empty line going out for a log.

The Loader and Its Control

The loader equipment consists of two, three-phase, 60-cycle, 550-volt, 75-hp., 12-pole, slip ring motors, also equipped with solenoid brakes and full magnetic control. The loaders, like the yarder, have a mechanical gear change producing a slow speed of 210 ft. and a high speed of 450 ft. per minute on the loading lines. The gear change is operated by air from two 52-cu. ft. air compressors, each driven by a 15-hp. motor, the same source as that supplying the yarder gear change. This air is maintained automatically at 125 lb. pressure.

Loading logs requires a wide range of speed on the loading lines, and as practically all speed variations when lowering the lines are obtained by a manipulation of the brakes, it will be necessary to describe the workings of the solenoid brakes somewhat in detail. The loader brakes consist of two sets of brake shoes operating on two brake drums

mounted on the motor shaft. The braking torque is applied and released through the operation of three solenoid coils which may be designated as "A," "B," and "C." Coils "A" and "B" operate one of the brakes while coil "C" operates the other. Coil "A" is connected between a collector ring of the rotor and the Y of the secondary resistance. Coils "B" and "C" are connected across the primary circuit.

Resistances are connected in series with each of the brake coils, these resistances being automatically cut out at different positions of the controller, thereby varying the current in the solenoid coils thus varying the braking torque. The brake operated by coils "A" and "B" is capable of a torque of 900 lb. at 1-ft. radius, which is 130 per cent of normal motor torque, while the brake operated by coil "C" is capable of 800 lb., or 120 per cent of normal motor torque. Thus a total of 250 per cent of normal motor torque is obtained, and since the motor works through a 17:1 ratio, this means that a fir log containing nearly 9,000 board feet and weighing 60,000 lb., can be held in the air by the brakes if necessary.

At each successive position of the controller a braking torque corresponding to a motor torque is produced. The following table shows these torques and also the size log that would be lowered slowly into place:

Controller Position	Per cent Braking Torque	Per cent Motor Torque	Size of fir log that would be lowered slowly	
off	250	0	Board ft.	Lb.
1	200	50	5,000	36,000
2	155	50	3,600	25,000
3	105	50	2,000	14,000
4	35	50	Line running free	
5	35	110	Line running free	
6	35	152	Line running free	
7	35	210	Line running free	
8	0	235	Line running free	
9	0	292	Line running free	

With the machine running in high gear the sizes of the logs would be one-half those given above.

When the controller is placed in the first position for hoisting, the motor torque slightly exceeds the braking torque making it possible to raise a light load slowly which is necessary when a man is pulled up to work on the rigging in the spar tree. From the second position on in the hoisting direction no brakes are applied, the resistance being cut out in the secondary circuit step by step in the manner customary in operating wound rotor motors. The lifting capacity of this loader is 28,000 lb. per line, or 56,000 lb. with both loading lines. This means that an 8,000-ft. fir log, weighing 28 tons, can be lifted.

Performance of Electrically Driven Machines

The first of the machines just described was received early in the summer of 1921. Three units consisting of a yarder and loader each, the two machines making a complete "side" mounted on one sled 60 ft. long, were assembled and put into operation in July, 1921, completely electrifying one of the camps. In 222 days these three units had yarded and loaded 65,000,000 ft. of timber off 1,000 acres, an average of 100,000 ft. per day per "side." This record would prove to any practical logger that the "electrics," as they have come to be called, are log getters, particularly when it is also stated that the

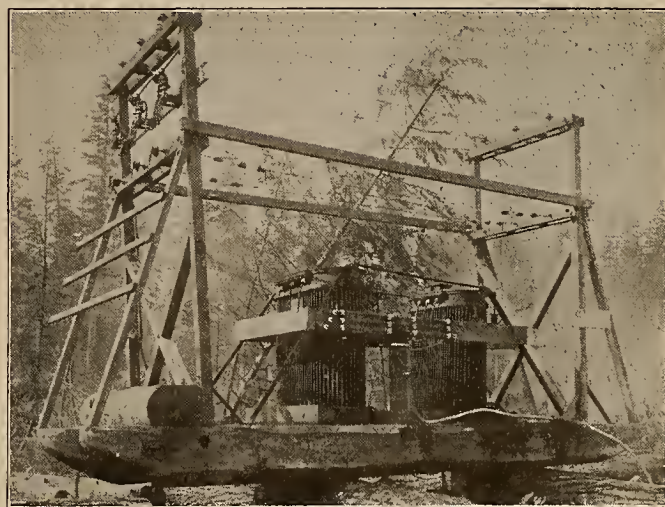
timber was less than 50 per cent fir, the remainder being hemlock and cedar about evenly divided, with the average log containing a little less than 1,000 ft. The kw-hr. input per 1,000 ft. during this period was 9.23. The second camp was electrified in the spring of 1922, completing the first electrification to succeed in the woods.

The main power line, which will be eventually 20 miles in length, extends out at present five miles. Cedar poles, steel pins and steel pole tops with porcelain pin type insulators are used in the construction of this line. The temporary power lines built in the woods are strung on small standing trees, the trees being trimmed and topped with the cross arm fastened on by a patented chain device. From six to eight miles of temporary power lines are built and abandoned each year. The principal item of cost is labor, the material being salvaged and used again.

Operating Characteristics of the Load

A graphic wattmeter test taken during a period of one month with six "sides" and one "swing" operating with a total connected load of 2,800 kw., showed a maximum average input for one hour of from 1,000 to 1,100 kw., the minimum average input ranging from 650 to 925 kw. The average input for eight hours during the same period was 875 to 1,000 kw. Peaks of 2,800 kw. occurred about once a day; peaks of 2,400 kw. occurred from four to ten times a day; and peaks of 2,000 kw., from forty to one hundred times a day throughout the test. These peaks were momentary. The power factor was generally less than 60 per cent and rarely rose to 70 per cent, although with the load 1,500 kw. and over the load factor was always 60 to 75 per cent. The minimum kw-hr. input for any one day during the test was 7,000, the maximum being 8,050 kw-hr.

The operations at Snoqualmie Falls for the last five years have demonstrated beyond doubt that it is a physical possibility to carry on electric logging successfully, and the fact that four large operators have followed the example of the Snoqualmie Falls Lumber Company and electrified their logging operations would indicate that the economy of the practice is being accepted, and an entirely new use for electricity in industry has been found.



One of the first 22,000/600-volt transformer sleds used by the Snoqualmie Falls Lumber Company

Factors Entering into the Cost of Electrical Energy

By Lester S. Ready

Chief Engineer, Railroad Commission of the State of California

THE question, "Why should I as a purchaser of electricity to light my home or store pay from 5 to 8 cents per kw-hr. when the street railways and large power consumers buy electric energy for less than 1 cent and hydroelectric power at the plants is reported to cost less than 1/2 cent per kw-hr.?" is one that has caused many a utility man to scratch his head to find a convincing explanation.

Most of the public is familiar with the fact that the retail price of many commodities is 100 per cent in excess of the wholesale price. Those who have earned their living by farming have realized that the fruit eaten in the restaurant was charged for at a much higher price than was received for the fruit by the rancher. There always has been doubt of the justification for a price of 5 to 8 cents per kw-hr. for electric energy in the home when the company that buys it at the substation pays an average of 1 cent per kw-hr.

The wide variation in the price of electric energy is due mainly to difference in the cost of rendering the service of the hydroelectric utility which though great in size and representing millions of investment, is carrying on one of the most complete retail enterprises that exists and, at the same time is in the wholesale business to a greater extent than generally exists in other lines of business. Its business with respect to residence lighting represents one of the greatest retail credit enterprises in existence. One company has over 250,000 credit customers whose average monthly bills are less than \$2.50, yet it is selling power to concerns where the individual bill is approximately \$100,000 per month.

Many people spend more money in the 5, 10 and 15-cent store in a month than they pay for their electric service. They go to the 5, 10 and 15-cent store, crowd through the aisles, select their own purchases, wait for their change, and carry their purchases home. As compared with this, the electric utility delivers its service to each individual house. There it is ready on call, without delay. With the pressure of a button its service is at one's command. The consumer is freed from the inconvenience of carrying home from the store the commodity purchased, and the bill is presented at the end of the

STARTING with the generation of power, Mr. Ready takes it through the various steps before it reaches the consumer and presents a clear picture of the costs that are incurred by the central station rendering the service. In developing the reasons for the cost per kilowatt-hour to the residential consumer, the author indicates the reasons for the difference in rates applicable to small and large users of electricity.

month after the service is used.

The power company is one concern that puts into practice the plan of "producer to consumer" that is heralded as the method of reducing the cost of living. It carries on all of the activities which in other lines of business are handled by numerous agencies. Were kilowatt-hours "shoes," a concern, to do the same work that the electric utility does, would have to include the cattle raiser on

the great plains of the West; the railroads which haul the hides to the tanner; the shoe manufacturer; the wholesale merchant; the railroads which haul the shoes to the various cities; the trucking firms which deliver the shoes to the retail merchant; the retail merchant, and, lastly, the parcel delivery company which delivers the shoes to the home after they have been ordered.

The potential kilowatt-hours in the reservoirs and canals of the company might be compared to the hide on the steer's back; the kilowatt-hours on the switchboard of the hydroelectric plant as the leather coming from the tannery and, finally, the kilowatt-hours used to light the home as the pair of shoes received at the door.

The amount of the requirements of individual consumers of the electric utility varies from 10 to 20 kw-hr. per month from the small resident lighting consumer to 1,500 to 2,000 kw-hr. per month for the average industrial and agricultural consumer, on up to the large railway and wholesale company which purchases from 10,000,000 to 20,000,000 kw-hr. per month.

It is probable that few have visualized such a wide variation in the amount of purchases in any other line of merchandise. The consumer who buys \$1 worth per month and the consumer who buys \$100,000 worth per month in most other lines of commodities are supplied by widely different concerns. In the utility field, however, the one who pays his \$1 bill pays it to the same firm and deals with the same organization as the one who pays a \$100,000 bill.

In order to visualize more easily the system of a hydroelectric company, Fig. 1 has been prepared setting forth the different parts of the electric system

from the hydroelectric plant in the mountains along the transmission line to the substation, the stream and its connection, the distribution substation, the distribution system serving the industrial as well as the residential consumer. In this diagram single hydroelectric plants are shown for simplicity, although in general a large number is connected to each system, together with several steam plants, substations and a network of transmission lines.

Fig. 2 shows in relief the state of California. On this are shown the location of the numerous power plants and extensive network of transmission lines of the larger utilities, also the location of hydro plants in the high Sierra and steam plants at the seashore. Fig. 3 is a typical distribution system from the substation of such companies.

Sources of Power

The hydroelectric utility, by the installation of dams, ditches and pipe lines, stores and diverts the water of the mountain streams along the sides of the canyons and through the generating plants transforms the potential energy represented by the water high above the stream bed of the river into electric energy. The hydroelectric plants are located in general, from 100 to 200 miles from the centers of population. As electric energy is not transportable as other commodities are, in freight cars on trains, long transmission lines from the power plants to the substation of the city must be constructed. This requires large additional investments and, for economy, the stepping up of the voltage to 100,000 to 200,000 volts at the power plant. At the main receiving substation the voltage must be stepped down to the distribution or secondary transmission voltage.

The streams of the California mountains do not run uniformly, and the years vary in precipitation to such an extent that the hydroelectric plants cannot be depended upon to make available a continuous full supply of power. Steam plants are constructed near the main centers of power load to guarantee against interruption of service should the long transmission lines fail and also to supply an amount of power during the dry months of the year when the hydro plants' output is reduced, and to guarantee against a curtailment of power when years of drought occur, such as the one just passed. The power companies are required to supply the load as demanded by each consumer, not as the utilities wish to supply. They must anticipate the demands to be made. There is no delaying of delivery to existing customers.

Fig. 4 shows the daily output in kilowatt-hours for one utility, analyzed for 1923.

The importance of steam stand-by plants is apparent at a glance, for 55 per cent of the power was obtained from this source during December, 1923, while in April over 80 per cent was produced by the hydro plants. In 1924, due to the extreme shortage of water supply, over 80 per cent of the supply of power was obtained from steam plants in September.

The hydroelectric and steam plants combined deliver to the main substations a dependable supply which is available for sale to the public. From these substations large quantities are purchased direct by street railroads; large industries, including cement plants, gold dredgers and the like; other electric utilities and municipalities which distribute electric energy to their own consumers. From these substations extensive networks of pole lines extend over the streets and roads carrying the electric energy to

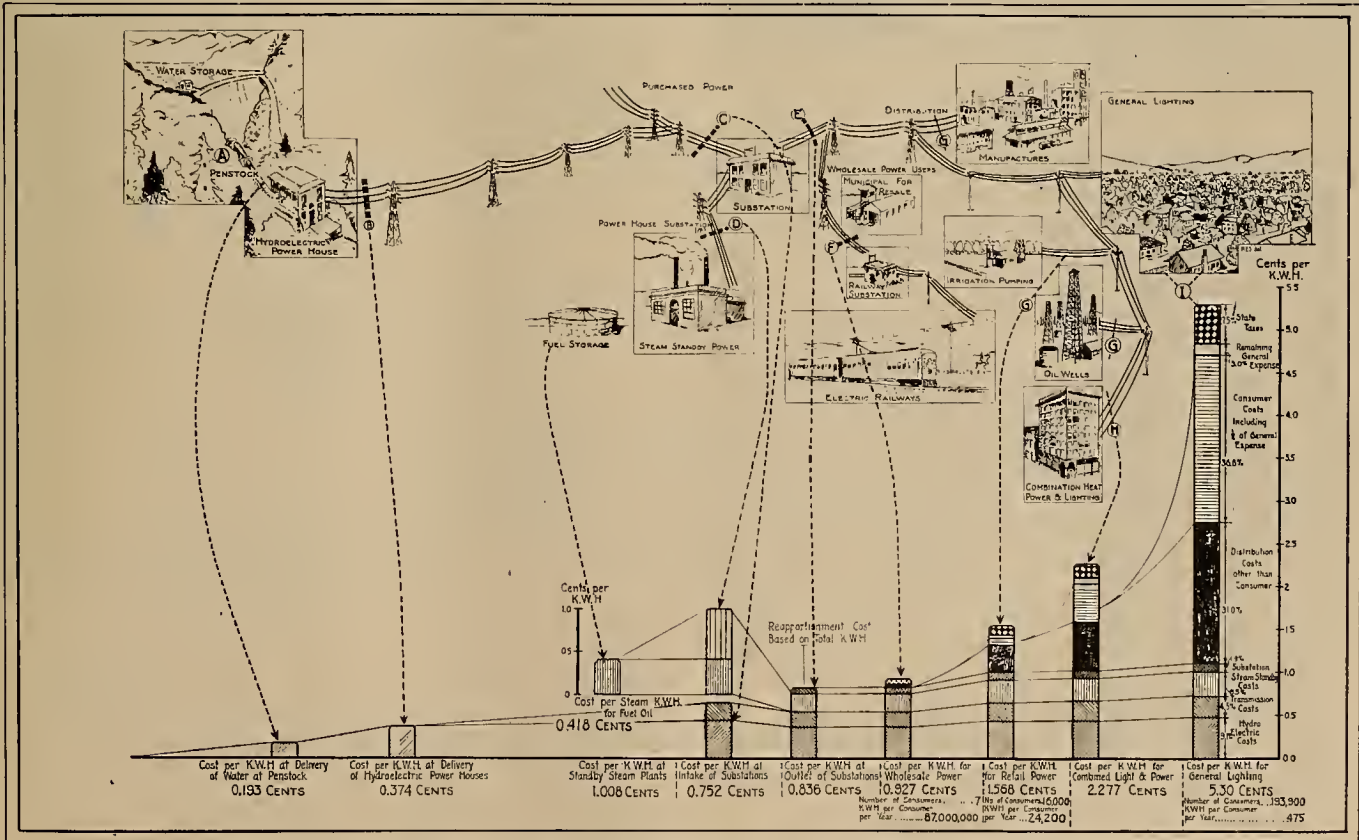


Fig. 1—Showing the costs of electrical energy at different points on the utility system

every consumer of the company. The energy is used on the farms to pump water for irrigation; by the industries for running their manufacturing machinery, and in the homes and stores for lighting and operating the various convenient appliances which have become so necessary in daily living.

The Cost of Electricity at Different Points

At the bottom of Fig. 1 is set forth in graphical form the average cost per kw-hr. of electric energy at different points on the system of one of the largest hydroelectric utilities in California for the year



Fig. 2—Topographical map showing interconnected systems in California

1923, which closely approximated an average year of water supply and a year when fuel oil for the steam plants cost approximately \$1 per barrel.

In determining the cost of electric energy per kilowatt-hour at the different points on the system, as set forth in Fig. 1, cost has been determined by computing the total charge up to each point, including a reasonable return upon the money invested, depreciation and all operating and maintenance expenses. This total annual cost has been divided by the average number of kilowatt-hours produced in the year 1923 and delivered at the points considered. No attempt has been made to segregate those costs which are dependent upon the demand which the consumer makes from those dependent upon the length of time energy is used. It should be borne in mind, therefore, in the study of the chart, that average costs only are shown. The costs of service to users who require small amounts of energy, or energy for only a short time each day, or a short time during the year, in general would be greater than the averages for the classes shown.

The energy as it is delivered on the switchboard of the hydroelectric plant represents on the average

a cost of less than 0.4 cents per kw-hr. This cost is made up mainly of interest on the investment in dams, canals and power houses. This power, however, is available only in the high mountains where little market exists. Further study of Fig. 4 entitled "Daily Total Output," shows that the hydroelectric output is far from continuous and uniform. On the system in question the water power available during the months of April and May totaled approximately 3,500,000 kw-hr. per day, while in December it had dropped to approximately 2,300,000 kw-hr. In 1924, an exceptionally dry year, the water power varied from 4,000,000 kw-hr. per day in April to 1,000,000 in September. Although the year was a relatively dry one, it is very apparent that this power would be of little value to the general power-using public if other sources were not available to make up the deficiency during the dry months and make possible delivery to the consumer of whatever power he needs upon demand.

The Cost at the Substation

Delivered at the substation from 100 to 200 miles from the hydroelectric plants, the cost of the hydro-produced power has increased to approximately 0.75 cents per kw-hr. Losses have occurred which increase the hydro portion of the cost of energy approximately 10 per cent. It takes energy to transmit or transport energy, just as it does other commodities. Added to the hydro cost is the cost of transmission, or one might say, freight. This is mainly interest, depreciation on and maintenance of the investment in transmission lines.

The steam plants for the average year are called upon to produce approximately 20 per cent to 30 per cent of the energy required. The fuel cost of the year analyzed represents 0.4 cents per kw-hr. of

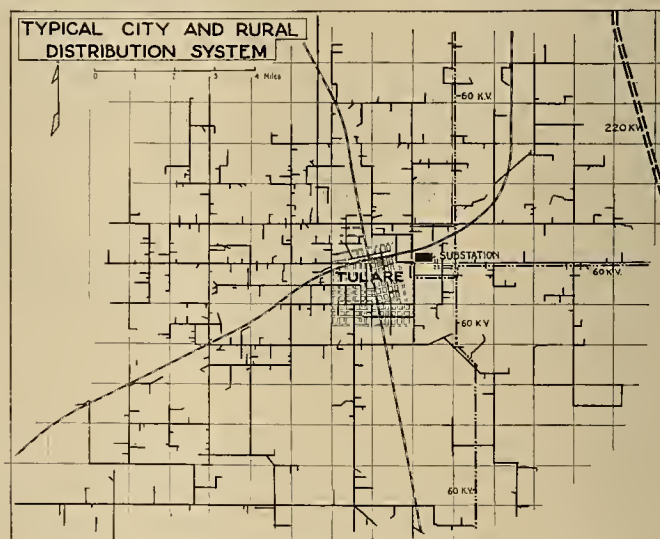


Fig. 3—A typical city and rural distribution system

steam power produced, and the total steam costs, including labor, maintenance, interest and depreciation on the investment in steam plants, increased the cost of energy delivered at the switchboard of the steam plants to approximately 1 cent per kw-hr.

The column (Fig. 1) indicating the cost of this energy from the substation shows that the cost is

made up of a portion representing the hydro cost, a portion representing transmission of the hydroelectric energy, a portion representing steam stand-by costs, and the balance representing the cost of handling the energy through the main substations. This total cost of approximately .84 cent for the year in question represents the average cost of energy delivered from the substations. It is made up of operating expenses of the plant, maintenance, depreciation and a return upon the money invested, the last being the largest single item because of the relatively large investment required.

The Cost of Wholesale Power

The next column representing costs indicates the cost of energy delivered from the substation to the wholesale power consumer, such as municipalities and other electric utilities that redistribute power, railroads and large industrial consumers. The substation cost is increased for a short distribution for general expenses involved in the general supervision of the business and $7\frac{1}{2}$ per cent payable to the state in taxes.

It is to be noted that the average consumption of energy by this group of consumers of the company in question totaled 87,000,000 kw-hr. per consumer per year. Two of the consumers purchased approximately 200,000,000 kw-hr. each during the year, or over 400,000 times the use of the average lighting consumer.

From the substation extend distribution lines out through the cities and rural territory, some in the form of underground cables, others in the form of pole lines, with branch lines here and there to factories or pumping plants. From these same lines the lighting consumers are served.

The cost of the energy increases rapidly in this retail distribution. The average cost of energy delivered to the power consumers is approximately 1.6

cents per kw-hr., or almost twice the cost at the substation. There has been a loss in the distribution, for the conductors are not perfect, and the transformers require some energy in their operation, though this is small. This loss increases the cost at the substation approximately 20 per cent. Then there is the interest, depreciation, maintenance and operation of the distribution system. Next the interest, depreciation, maintenance and operation of the service and meters, reading meters, preparing of bills, collecting of money, adds to the cost of energy. This latter cost, connected directly with the consumers' service, is not a large item per kilowatt-hour for the power consumer as his use averages approximately 2,000 kw-hr. per month. General expenses and taxes, mainly state taxes and franchise tax, further increase the cost.

The Cost of Residential Service

Considering next the lighting consumer, the enormous increase in cost is primarily a distribution and consumer expense. The distribution expense per kilowatt-hour increases largely because of the small amount of business that each consumer represents. On the lines of the company in question there were 194,000 lighting consumers, as compared with 16,000 power consumers, yet these 194,000 consumers use less than 7 per cent of the energy while the 16,000 representing 8 per cent of the consumers use 37 per cent of the total. The wholesale consumers, representing less than 0.5 per cent of the number of the consumers, use 41 per cent of the output. The average use per year of the lighting consumers is approximately 490 kw-hr. or 40 per month, while the average power consumer uses 50 times as much energy, and a wholesale power consumer almost 200,000 times as much energy. Fig. 5 is given to help visualize the relative extent of system to serve the lighting consumer compared with the wholesale

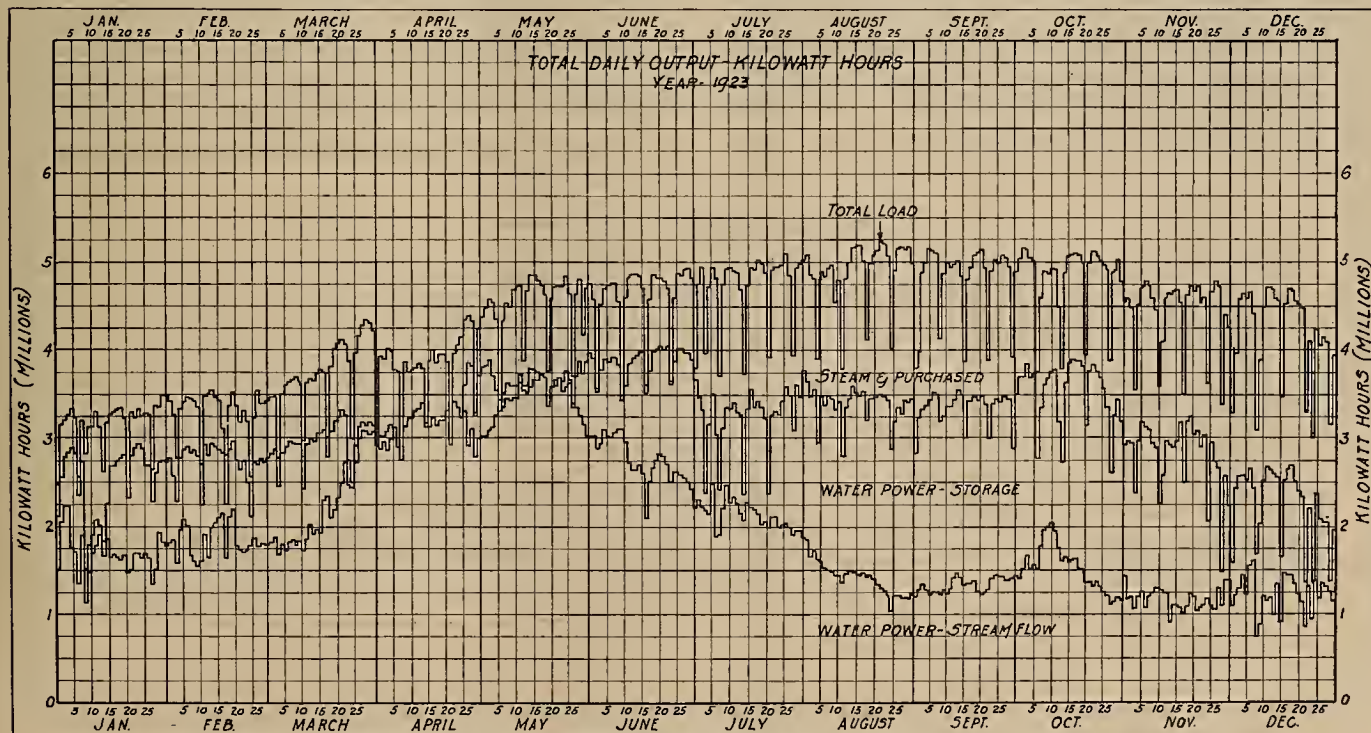


Fig. 4—Showing sources of power making up total daily output of one company for 1923

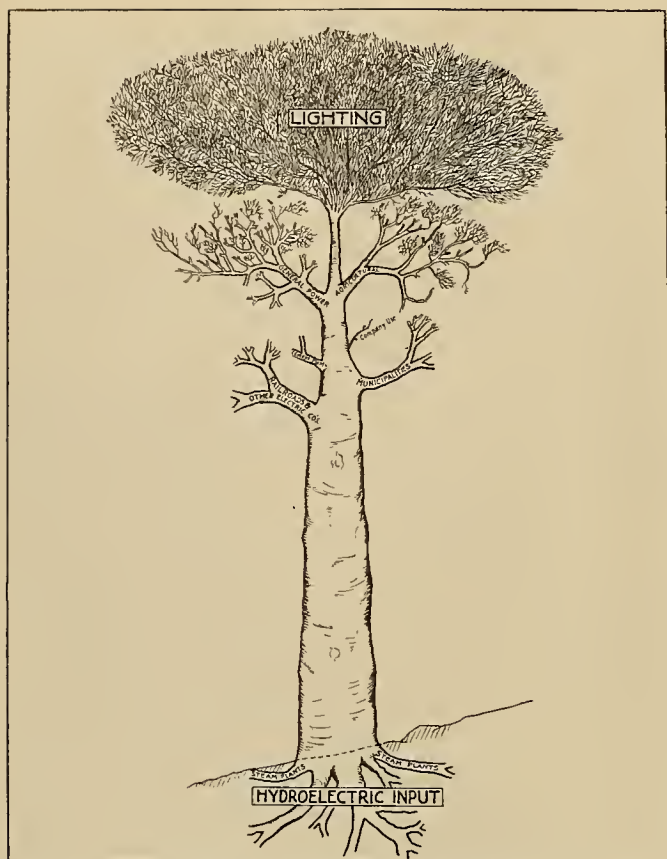


Fig. 5—Showing relative extent of system necessary to serve various classes of consumers

power consumers and also the relative size of each. It is not surprising, with this small retail business where investment must be maintained so that each small consumer is connected to the system 365 days in the year, or 8,760 hours per year, that the distribution expense materially increases. The biggest single item of expense in the service to the small lighting consumer, however, is that which is incurred almost between the street and the consumer's premises. Interest, depreciation, maintenance and operating expenses in connection with the service wires

and meter, the reading of the meter, making out and presentation of bill, collection of money, amounts to approximately 75 cents per month per consumer and represents practically 2 cents per kw-hr. of average use. For the consumer using but 20 kw-hr. this is practically 4 cents per kw-hr. This cost varies but slightly with the amount of energy used by the consumer. Owing to the small use compared with the investment required to serve him, the labor and expense incurred in caring for his account and seeing that he is given good service, the expense of maintaining men at his call when fuses are burned out, and similar items of service, this cost is relatively large per kilowatt-hour and exceeds the entire cost of energy delivered from the substation.

General expense and supervision partly is incurred directly on account of the number of consumers and partly in general supervision on the entire system, and again the percentage paid for taxes increases the total by a greater amount per kilowatt-hour.

In general rate schedules, the rate for lighting service is higher than the total of 5.3 cents per kw-hr. stated here. Full consideration in this analysis has not been given to the higher class of service required by lighting service than by power and other items which tend to justify higher rates than the costs indicated. From a strictly cost basis, the lighting consumer properly should be charged a fixed sum per month, say 75 cents or \$1 plus a lower rate for energy consumed. Such a form of rate probably would result ultimately in lower rates to the consumers and make available, to those who desire, relatively low rates for additional service for other conveniences in the home.

Referring to the other charts which are presented, Figs. 6 and 7 show in the form of a flow diagram which might be compared with a stream the flow of energy in the hydroelectric system. For the year 1923, a normal year, it appears that 73 per cent of the energy is produced by hydro, approximately 10 per cent is lost in transmission, 21 per cent is added from steam plants and 5.6 per cent purchased. Approximately 50 per cent of this power is delivered

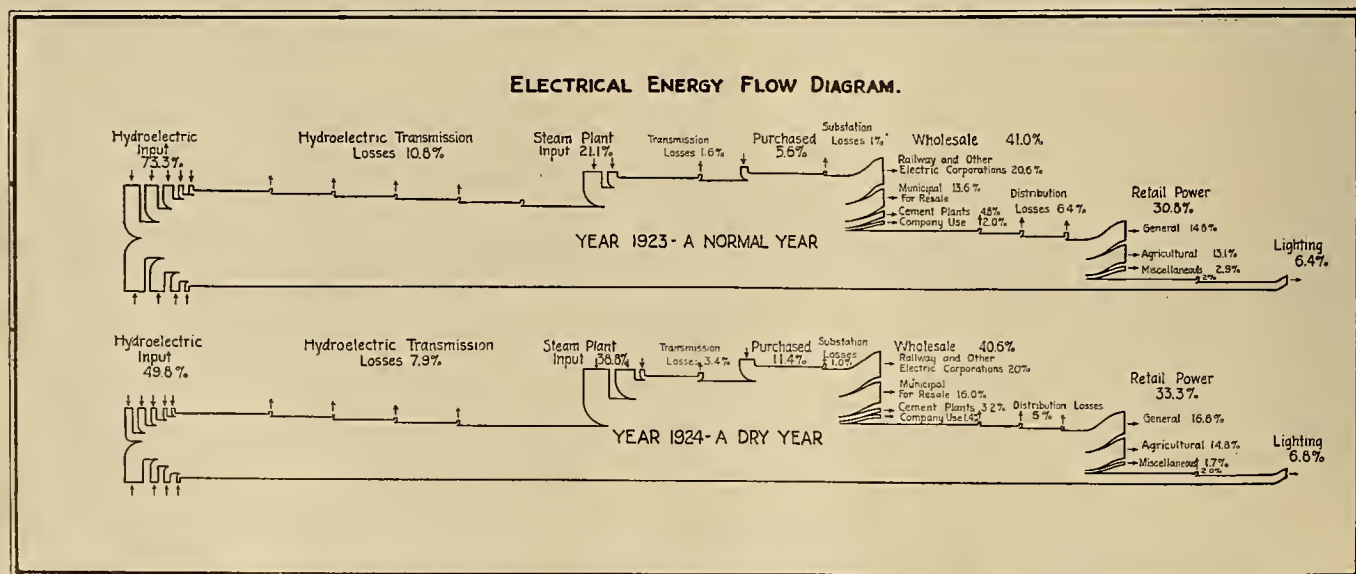


Fig. 6.—Showing the relation of hydroelectric to steam-electric input and channels through which power was sold during a normal and a dry year

wholesale to 7 consumers, 30 per cent to retail power consumers totaling 16,000 and the 194,000 lighting consumers actually purchased only 6.4 per cent of the total energy.

In a dryer year, 1924, the hydro output shrunk to 50 per cent and it was necessary to produce by steam and purchase the other 50 per cent. In April, 1923, 84.5 per cent of the energy was produced by hydro, in September, 1924, but 20 per cent, and the steam plant and purchased power output increased from 15.5 per cent to 79.8 per cent. During the wet month 43.5 per cent of the power produced was for wholesale power, 43.6 per cent retail power and lighting and distribution losses. It is to be noted that though in the wet month of April only 14 per cent was required by agricultural users in a month when the hydro-electric power was the minimum the agricultural demand increased to 24 per cent.

Space is not available to go into detail relative to the costs and their specific make-up. The analysis showing the variation in cost of rendering service to consumers, dependent upon the size of the installation, in itself readily could be the subject of a special article. One example, however, of the variation in the cost of delivering service may suffice to indicate the general situation.

Table I sets forth the average investment in transformers, service and meters necessary to connect up different sized motor installations to the 11,000-volt distribution lines generally used in service of agricultural pumping installations. There is set forth also the annual cost in total and the annual cost per horsepower incurred by the company as the result of maintaining this equipment for the consumers' service. These costs, increased for taxes and general expense as shown in the sixth column, represent the minimum out-of-pocket cost to the company for being ready-to-serve the different sized installations. Nothing is included to cover the cost of production, transmission or distribution of the energy to the transformers located next to the consumers' pumping plants. On the distribution system studied, the distribution cost representing interest, depreciation,

Table I—Annual Cost of Distribution of Power on 11,000-Volt Rural System to Motor Installations*

Transformer service and meter						
Size of motor in hp.	Investment		Annual cost including interest and expense		Annual cost including general expense and taxes per	Total annual distribution expense from substation to consumer
	Total	Per hp.	Total	Per hp.	hp.	per hp.
3	\$190.00	\$63.33	\$34.51	\$11.44	\$12.95	\$18.89
5	302.00	60.40	48.20	9.64	10.91	16.85
7½	341.00	45.47	53.91	7.19	8.14	14.08
10	351.00	35.10	55.30	5.53	6.26	12.20
20	488.00	24.40	74.40	3.72	4.21	10.15
50	746.00	14.92	113.30	2.27	2.57	8.51
100	1,128.00	11.28	172.00	1.72	1.95	7.89
300	2,026.00	6.75	332.90	1.11	1.26	7.20
500	2,590.00	5.18	451.90	.90	1.02	6.96
*This is additive to cost of power delivered to distribution system from substation, to give total cost.						

*This is additive to cost of power delivered to distribution system from substation, to give total cost.

maintenance and operation of the pole lines from the substation to the consumers' transformers, aggregates an annual charge of \$5.25 per horsepower served. If this cost, which represents an expense whether the motors are operated or not, is added, together with the general expense in taxes applicable, the total annual cost per horsepower for the distribution of the power from the substation to the consumer on the 11,000-volt rural distribution system would increase to that shown in the last column.

With an average cost of energy delivered from the substations of approximately 1 cent per kw-hr., increased for distribution losses of approximately 20 per cent, the cost of service, were the distribution system in question to bear the full average cost of distribution, might be written as the charges per horsepower listed in the last column of this chart plus approximately 1¼c. per kw-hr. used.

The above will indicate some of the causes of variation in rates for power service, why rates for small installations are greater per kilowatt-hour and per horsepower than for large installations, and why the rate per kilowatt-hour of energy for power service reduces as the use per month increases.

Many other analyses, somewhat similar to this, could be submitted but it is believed that sufficient has been set forth to indicate the fundamental reasons for the wide variation in rates found in the schedules generally charged by electric utilities.

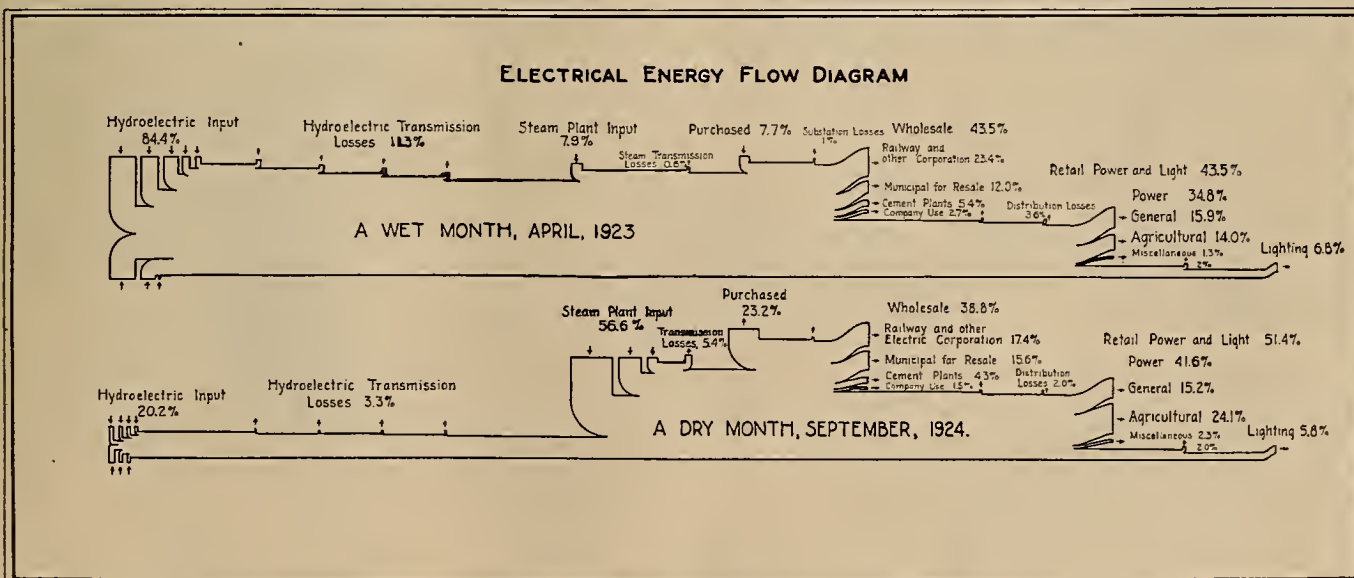


Fig. 7—Showing relation of hydro and steam-electric input and channels through which power was sold during a wet and a dry month

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Carriage for Oil Filter Press Proves Labor Saver

Economical and Easily Made Transporting Device Makes all Parts of Station Yard Readily Accessible

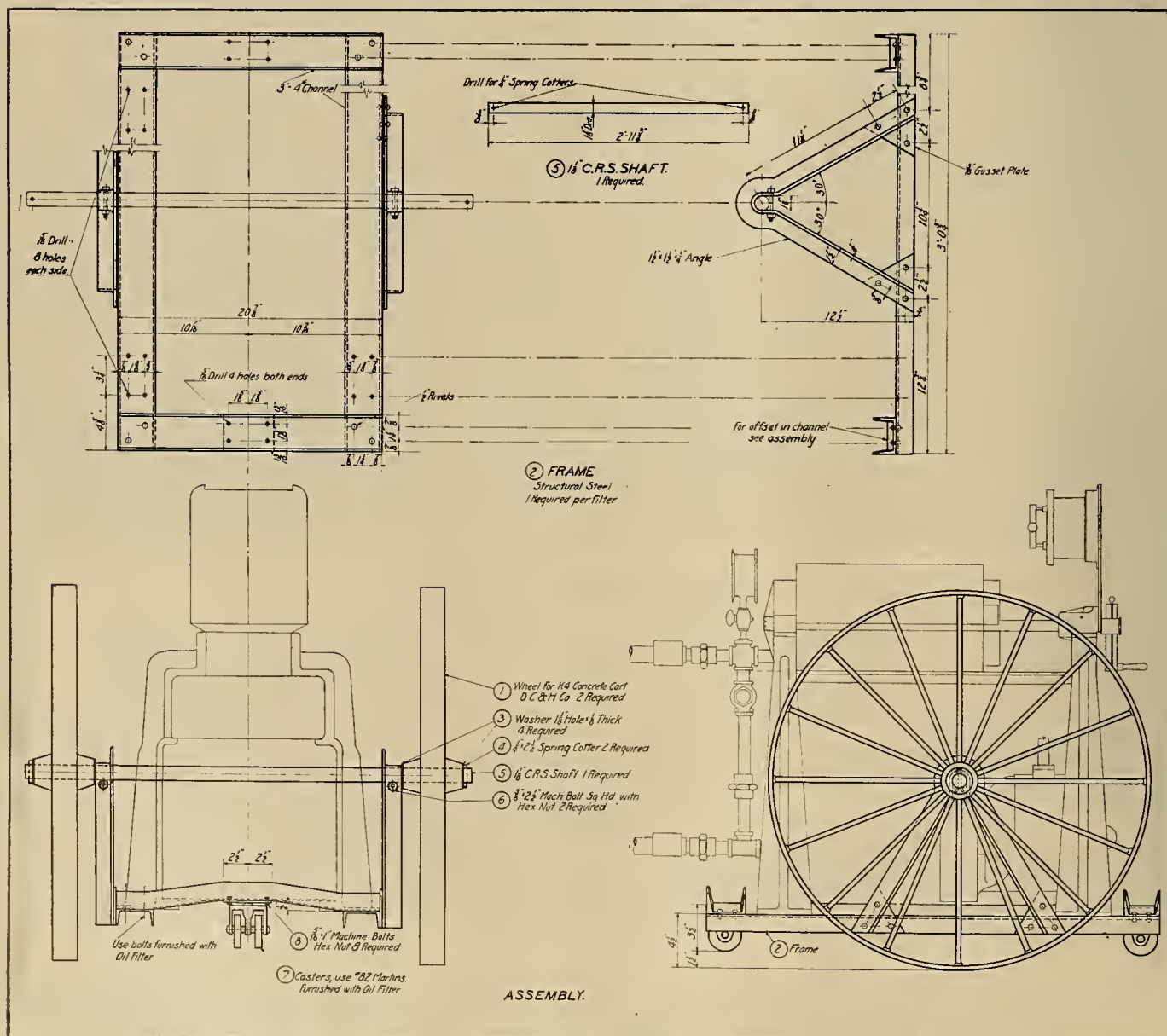
An oil-filter press is a handy piece of equipment to have around a station provided it is sufficiently portable. In the old-style station where all of the oil-filled apparatus was situated within the four walls of the building, the ordinary caster-fitted dolly sufficed admirably. However, with the advent of outdoor equipment with graveled walks and lawn plots intervening, the oil filter fitted as above described proved to be portable in name only.

The use of a portable oil-filter press is confined principally to small transformers and high-voltage oil-circuit breakers and in stations where it is not considered essential to have oil-storage tanks. Where portable outfits are used, conduits are run and power outlets provided for the convenient operation of the filter press. This facility is provided for both indoor and outdoor substations.

The 7-in. filter press used by the Pa-

cific Gas and Electric Company weighs roughly 500 lb. To facilitate the ready movement of this piece of equipment, a light steel framework was devised. This is made up by the company and consists of channels, angles and small plates. The accompanying illustration shows the structural details and important dimensions. The wheels are ordinary concrete buggy wheels of 30-in. diameter.

This carriage makes it readily possible for one man to handle the press over comparatively rough ground. If the press is to remain in one place for some time and the wheels interfere with the changing of blotters, the wheels may be taken off and laid aside until



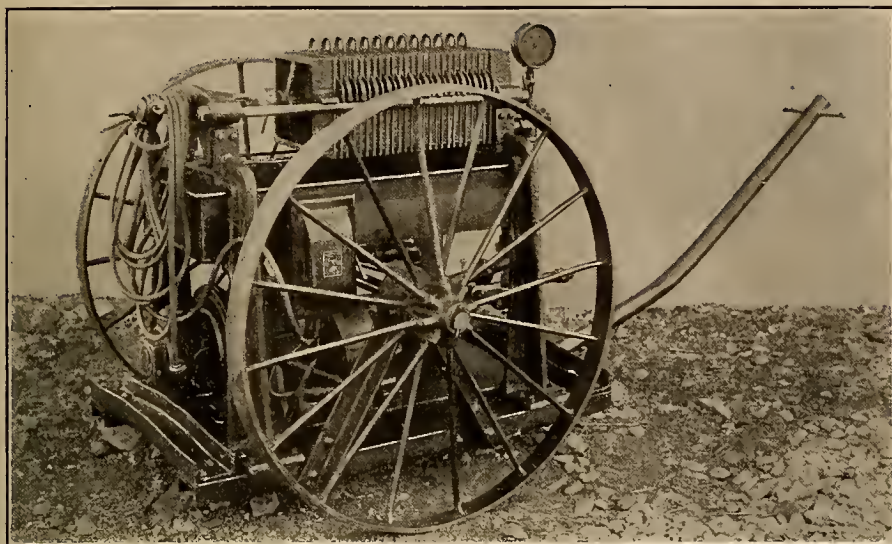
Construction details of 7-in., 500-lb. filter-press designed for use in stations of the Pacific Gas and Electric Company

again needed. To accomplish this all that is necessary is to slip out the cotter keys from the ends of the shaft and slip the wheels off.

In substations employing large transformers and oil circuit breakers where considerable oil is handled, portable presses are not used; instead an oil

pipng system is installed, and the cleaning of oil is done at a central point where handling tanks are installed.

To facilitate the handling of the centrifugal oil filters which are being used by this company at present, a carriage similar to that used for the filter press now is being developed.



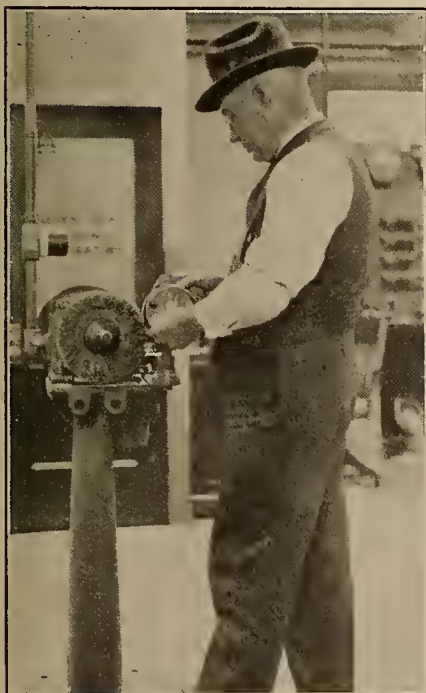
Portable oil filter press used by the Pacific Gas and Electric Company

Watt-hour Meter Cleaned, Painted and Stenciled for 4 Cents

By W. H. TALBOTT

Superintendent Electric Meter Department, San Diego Consolidated Gas & Electric Company

Most of those who are responsible for the operation and maintenance of an electrical distribution system are so busy with the engineering problems



Meters brought in from old installations usually have to be thoroughly cleaned before repainting

that the little things which help to make it is thoroughly cleaned, it is painted by the use of an air brush. This painting an efficient organization are sometimes overlooked.

Thinking that it might be of interest, I therefore am giving a description of the method used by the San Diego Consolidated Gas & Electric Company for cleaning, painting, and numbering electric meters. This would seem a small item, but when it is considered that several thousand meters are handled each year an up-to-date method is very much desired. The system described is not new, as it is in use in a number of places. However, we feel that there are those who would adopt such a plan if the cost were not too great.

When meters are received from the manufacturing company, it is necessary to number and make a complete record of them. In most cases company numbers are stenciled on the case, after which the meter is tested and placed on a storage rack until taken out by the installer. For stenciling, a No. 72 Ideal stencil cutter is used. The number is cut and then stenciled on the meter case with an air brush. This makes a very satisfactory job and is done quickly, requiring less than a half minute per meter. This is less time than it would take to put metal stencils together.

Meters that are removed from the lines usually have to be cleaned, repainted, and renumbered. This is accomplished easily in a systematic way. Meters first are segregated according to sizes and voltage, after which the cleaning is done by using a buffing machine, which is shown in one of the accompanying illustrations. After the meter is done in a cabinet from which an exhaust pipe leads to the roof of the building. In connection with the exhaust pipe is a 16-in. fan which draws all fumes from the cabinet, therefore removing all odors which are usually present when using an air brush. An idea of the cabinet and method of using it is given in one of the accompanying illustrations. The speed with which a man can clean, paint and number meters is one of the most important features. Three minutes per meter is the average

time required with the described equipment and the cost does not exceed 4 cents per meter. The cost of the equipment is as follows:



The air brush saves much time and effort in meter stenciling and painting operations

Paint cabinet.....	\$ 88.58
Buffing machine.....	130.00
Stencil cutter.....	60.00

The above equipment has other uses which add to the efficiency of the department.

Love Life of an Engineer

Fools may sing of hearts and love
And eyes and cheeks and hair—
Write sonnets to a woman's glove
And swear her wondrous fair.
Bah! she's an artificial thing,
All powder, paint and lipstick—
But hearken to the song I sing,
And hail my love, the slipstick!

Women are babbling all the time
Of dates and drinks and dresses,
Which wouldn't help at all when I'm
Computing torques and stresses.
It conquers without fear or doubt
Whole hosts of sines and surds,
And helps me work in peace without
An avalanche of words.

Slide-rules are always accurate
And women never so;
And while they're not affectionate,
They never answer "No!"
So hence with women's wanton ways
With eyebrows, lips and curls,
My little log-log polyphase
Is worth a dozen girls!

—Synchronizer.

The General Electric Company has announced the re-design of its type CR-1034 hand-operated starting compensators. The new design is expected to accomplish closer overload protection through the use of temperature overload relays instead of dashpot relays. One size is manufactured with a multiple-rated auto transformer adapting it to use on motors of various sizes for a given voltage. Refinements in the push-button control are included.

Chart Simplifies Distribution Line Calculations

Circuit Characteristics Quickly Determined from Diagram
Which Combines Four Important Variables

By J. C. CAREY and C. V. FAIRCHILD

Engineers, Distribution Department, Southern California Edison Company, Los Angeles

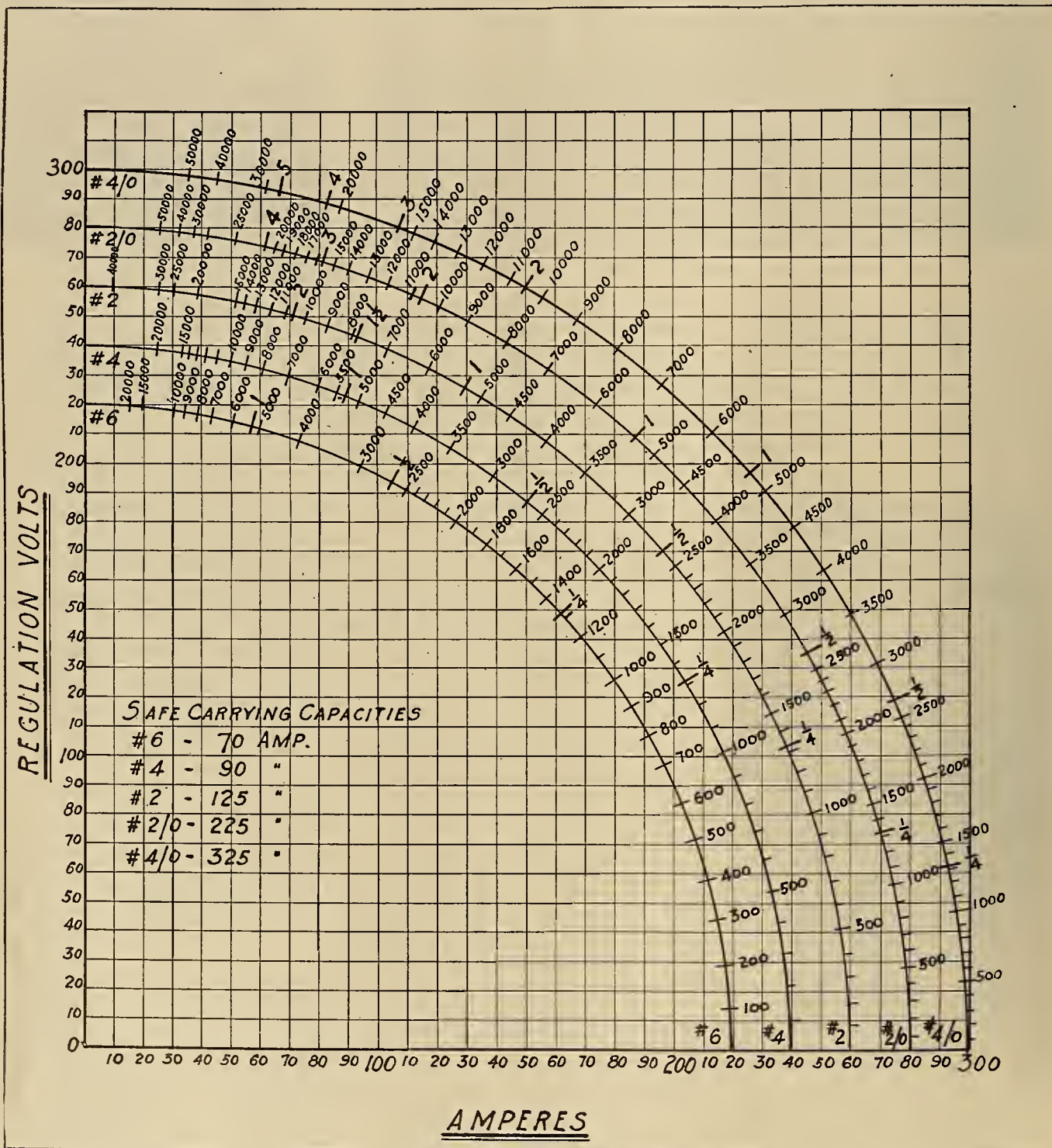
For some time this department has felt the need of a simple and practical method of computing three-phase distribution line characteristics. At the present time an ampere-feet table, based on resistance only, is included in the company's Book of Standards and is in general use. However, due to the increasing demand for closer voltage regulation and the loading-up and length-

ening-out of so many of our heavy feeders, it seemed necessary to include inductive reactance in the consideration of distribution line characteristics. It was desired that a single chart, or table, be constructed which would be applicable to the greatest number of cases and would still be simple and not contain too many variables.

The accompanying chart is based on

a "Chart for the Regulation of 50-Cycle Transmission Lines and Distribution Lines," by H. B. Dwight and published in the Journal of Electricity, Power and Gas, Feb. 21, 1914, p. 161. It is for the special case where the effective spacing of the conductors is approximately 1.5 ft., the power factor is 80 per cent and copper conductors only are used. This effective spacing is applicable to our standard "L" arm which is used almost entirely for 2,300-volt or 4,000-volt primaries and in a great many cases for secondaries. A power factor of 80 per cent is used, but there is very little error if it should vary between 65 per cent and 100 per cent.

This chart has four variables: sizes of



Distribution circuit regulation diagram which combines conductor size, load current, line length and voltage drop in such a way that if any three of these variables are known the fourth may be determined at a glance by the use of a straight-edge placed on the diagram as explained in the text

wire, length of line, load in amperes, and line drop, designated as regulation volts. There are five arcs, representing No. 6, No. 4, No. 2, No. 2/0 and No. 4/0 copper wire. The small-sized figures around these arcs are for the length of three-phase line in feet; miles and fractions thereof are designated by the larger-sized figures. Load amperes in one wire are along the abscissa and volts drop along the ordinate. Regulation volts may be considered as line drop for short distribution lines where capacity can be neglected. For single-phase lines, compute the same as for three-phase and divide the resultant line drop by 0.866.

To use the chart: Lay a straight-edge across the chart from the origin to some distance point on the arc for the desired size of wire. Where the load in amperes intersects the straight-edge, read across to the left for regulation volts or line drop. The procedure may be varied to find any one of the four quantities when the other three are known.

For example:

Problem 1.

A No. 2 feeder carries 100 amp. per phase to a center of distribution 1 mile from the substation. What is the voltage drop in the feeder?

Lay a straight-edge across the chart from the origin to the 1-mile point on the arc for No. 2 wire. It will be found

that the line extending up from 100 amperes intersects the straight-edge opposite 174 volts, which is the voltage drop in the feeder.

Problem 2.

It is desired to run a three-phase, 440-volt line, 1,400 ft. to a 50-hp. 440-volt motor. What size wire should be used so that the voltage drop in the line will not be more than 10 per cent?

A 50-hp., 440-volt motor requires approximately 64 amp. The allowable voltage drop is 44 volts. Lay a straight-edge from the origin to the intersection of the line from 64 amp. with the one from 44 volts. The straight-edge will be found to intersect the arc for No. 6 wire at 1,000 ft. and the No. 4 arc at about 1,500 ft. Use No. 4 wire.

Problem 3.

How far can 100 amp. (per wire) be carried on a three-phase, No. 2 feeder, at 4 kv. with a voltage drop of 5 per cent?

The allowable drop is 200 volts. Lay a straight-edge from the origin to the intersection of the line from 100 amp. with the one from 200 volts. It will be found to intersect the arc for No. 2 wire at approximately 6,000 ft.

Problem 4.

A No. 2/0 feeder is 3,000 ft long. The voltage at the substation is 2,300 volts. What load can be carried over this line with a voltage drop of 5 per cent?

The allowable drop is 115 volts. Lay a straight-edge from the origin to the 3,000-ft. point on the 2/0 arc. The line extending across from 115 volts cuts the straight-edge at approximately 183 amp.

Turpentine vs. Iodine for the Plant First-Aid Box

One of our subscribers asks: "Has spirits of turpentine any medicinal, or preventive-of-infection value when applied to open wounds?"

He asks this question because he has charge of the upkeep of his company's first-aid kits, replenishes exhausted supplies and keeps the kits clean and in good paint, and every once in a while he finds in one a bottle of turpentine. This is removed immediately according to instructions. Then a loud complaint is heard from the old-timer who put it in the kit when he discovers that his pet medicine is gone.

However, the first-aid man reasons that his company would not pay perhaps \$15 a gallon for iodine, or whatever they use for sure-fire first-aid work, if turpentine at \$2 or less per gallon was "just as good."

This question is raised because serious cases of infection have occurred among linemen, groundmen and others who have used turpentine for first-aid work instead of the antiseptic of real value.



Lake Chelan (Wash.) in the middle distance and the Columbia River in the foreground. Fruit warehouses of the Bee Bee Orchard District are shown strung along the right-of-way of the Great Northern Railway while the town of Chelan appears in the distance at the foot of the lake. The 60,000-volt transmission line which seems to disappear down the hill and challenges the eye to follow it across the river in the left foreground is the tie line built in 1923 by The Washington Water Power Company from Coulee to Chelan to connect that company's system with the acquired properties of the Okanogan Power & Light Company. The Cascade Mountains may be seen at the head of the lake. The Chelan River power site of The Washington Water Power Company is in the gorge at the left center of the picture near where the Chelan flows into the Columbia. The confluence of these two rivers is just outside the picture to the left.

IDEAS FOR THE CONTRACTOR

California Electragists Study Estimating Methods

Successful Method Used by Southern Division to Sell Its Members Electragist System of Estimating

By C. J. GEISBUSH, Executive Secretary

After making an analysis of the problems facing the members, the Southern Division of the California Electragists came to the conclusion that the first big problem to be considered by them was the subject of correct estimating. They realized this was the basis of all electrical contracting, for to be successful an electragist must know his costs and have confidence in them.

A detailed study was made of the method of estimating advocated by the Association of Electragists, International. A number of actual jobs was estimated using the Electragist Manual of Estimating, and these estimates were checked against the actual job as it progressed and also after its completion. The results were very encouraging. Ways and means then were devised for presenting this system of estimating to all of the members of the Association.

A large-sized plan of a one-story building on a scale of three-fourths of an inch to one foot was drawn for the purpose of explaining to the members the proper method of layout for any job regardless of size; the use of the wiring symbols as adopted by the American Institute of Architects and the Association of Electragists, International; and third, but not least, the simplicity with which materials can be taken off a print once the electrical system has been laid out properly. Estimating classes are conducted at meetings in various cities. For the purpose of brevity materials on only one store and all the feeders are taken from the print. The method used in taking off the entire job would be no different than that used in taking off one store, and the lesson remains just as valuable to the members.

The architectural details of this job were laid out with red ink and the electrical system with black so as to have the most contrasting colors, black and white, for the conduit system. This was done by Lee C. Baltzelle of the J. J. Farley Company, Fullerton, who is serving as estimator in presenting this to the members. This sheet usually is placed on some sort of blackboard and illuminated so that Mr. Baltzelle easily may show to the assembly the steps used in taking off material. Three of the five job forms have been enlarged to 2 x 3 ft. These are hung close to the large diagram, and as quantities of materials are taken from the print the proper place of entry is designated by the speaker. Each member has, at his place, one complete set of the five job forms and a photostat of the plan of

the job being estimated. These job forms and the photostat are clipped to a board so that the members may turn away from the table and enter the items with ease.

The materials are taken off the sheet by the use of a rotometer and tallying machine as recommended by Arthur L. Abbott, chairman, Cost Data Committee, Electragists, International. Every movement of the estimator is traced by each one present on his photostat of the plan. The various material quantities are noted by each member present. After all materials have been taken from the plan and summarized, a transfer is made to the pricing sheet, special attention being shown to the checking of material quantities as taken from sheets 1, 2 and 3 and placed on pricing sheets 4 and 5. This is especially necessary as it provides a check on the entire job and prevents the possible overlooking of any quantity. The conversion of material into labor is done by the use of the Electragist Manual of Estimating. It is to be regretted that sufficient supply of these manuals is not available to give one to each member present, but as it is the labor units covering the various materials listed are given by the estimator from the only available Data Book. No material prices are noted as we are concerned

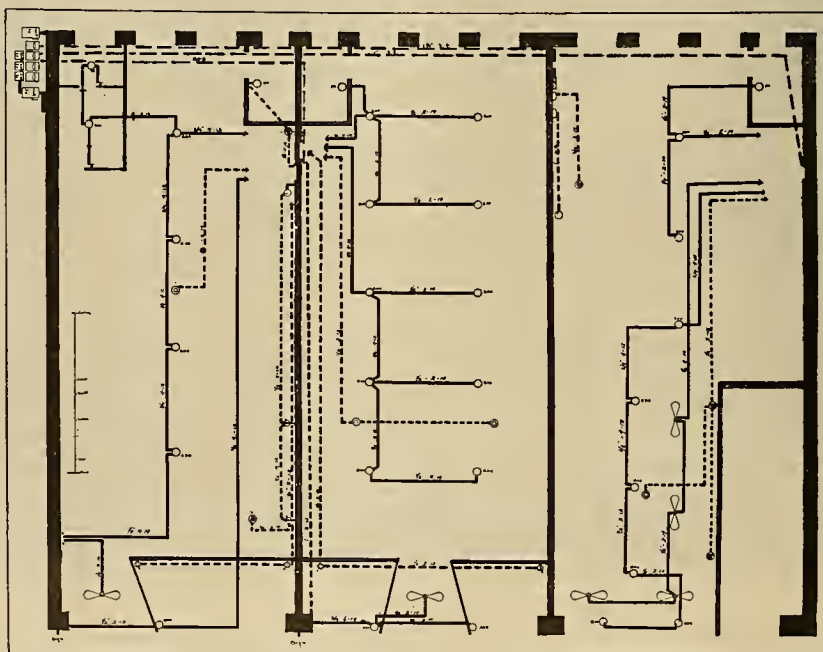
entirely with the take-off of quantities and the conversion into labor.

Every detail in connection with the use of the system is explained as the estimating progresses, and any questions of those present are discussed. As each member has a photostatic copy of the plan and all of his estimating sheets, he can go over the job at his office at any time and clear up any details which may slip his mind. This method of selling the Electragist system of estimating to the members is very successful and is receiving their wholehearted support, as indicated by the fact that in every section orders have been placed for the complete Electragist Data Book Service, a complete set of job forms, a rotometer and a tallying machine. The sets, tallying machine and rotometer are furnished to the member at cost.

The writer wishes especially to commend Mr. Baltzelle for his unselfish sacrifice of time in the preparation and presentation of this system of estimating.

The Southwestern Light Company, formerly at 2521 E. Fourth Street, Los Angeles, has opened a new store at 2814 Brooklyn Avenue. Edward B. Raskin is the proprietor. He will continue in the contracting business but will carry an increased stock of electrical supplies and appliances.

The Blackie Electric Maintenance Company is the firm name of a new electric service shop recently opened at 1422 West Ninth Street, Los Angeles.



Photostat of the plan being estimated. The store on the left was the one used in the study of estimating

[illegible]

FORM 20

FEEDER SCHEDULE

ESTIMATE NO. 1

SHEET NO. 2

JOB Blank

OF 5 SHEETS

DATE 5-1-25.

ESTIMATED BY			CONDUIT						WIRE					
VELOCITY FT./MIN.	FROM	TO	WIRE DIAMETER	LENGTH FT.	LB.	TECH.	POWER	NO. WIRES	SIZE	LENGTH				
1	11a	Entrance	M. 3.	12"	15	1	4	0	3	#1	75			
2		M. 3.	Store 162	12"	32	2	8	1	6	#8	238			
3		M. 3.	" #5	1"	72	2	2	1	5	#8	234			
Power														
4		Entrance	M. 3.	12"	15	1	2	0	3	#4	50			
5		M. 3.	Power Panel	12"	65	2	2	1	3	#4	210			
6		Power Panel	12" Motor	2"	12	0	7	2	3	#8	91			
7		" "	" 5 HP Motor	2"	12	0	7	2	3	#10	91			
Lighting														
Terminals														
1		M. 3.		100	AMP.	M.O.	6	100	AMP.	.78	each	4	68	
2 & 3		Sub-Panel	11-12 #3	50	"	S.F.	18	60	"	.68	"	9	90	
4 & 5		Motor Switch		100	"		5	100	"	.78	"	4	58	
5 & 7		Power Panel		50	"		12	50	"	.65	"	6	60	
Taps														
Lighting														
1		Gutter		9	Taps		\$1 to \$8			.50	"	4	50	
5 & 7		Power Gutter		5	"		\$4 to \$8			.45	"	2	70	
Connect Motors														
1		5 HP								2.00	"	3	91	
2 & 3		7 1/2 HP								4.16	"	4	16	
Mounting Guitars														
1		4" x 4" x 5" Gutter								2.27		2	27	
1		4" x 4" x 5" "								1.67		1	67	
Poles Terminals														
1		0 Circuit Panel					16	30	AWG.	.87		4	35	
							3	60	"	.58		1	65	

CONDUIT AND WIRE SUMMARY					ESTIMATE NO. <u>1</u>			
JOB <u>Blank</u>					SHEET NO. <u>5</u>			
					OF <u>5</u> SHEETS			
ESTIMATED BY					DATE <u>5-1-25.</u>			
2"	1"	1/2"	1/4"		#10	#8	#4	#1
12	72	32	18		53	228	60	75
12		15				224	#10	
		65				51		
24	72	122	15		53	513	270	75
ALLOY	6	3	3					
30	75	116						
116	516	216	316					
0	5	2	1					
0		1						
		2						
0	2	8	1					
Type	Size	Type	Size	Type				
7	#	0	4					
7		2						
		2						
14	#	18	4					
Round	Round	Round	Round	Round				
2	1	1	0					
2		0						
		1						
4	2	2	0					

PRICING SHEET

DATE <u>11-1-66</u>	ESTIMATE NO. <u>1</u>
JOB <u>Blank</u>	SHEET NO. <u>4</u>
WORK <u>Lighting and Power</u>	OF <u>5</u> SHEETS

ESTIMATED BY	PRICED BY	EXTENDED BY	CHECKED BY	DATE <u>8-1-65</u>			
MATERIAL	QUANTITY	MATERIAL UNIT PRICE	PER DIAL.	EXTENDED	LABOR UNIT PRICE	PER C	EXTENDED
1# Conduit	220			1.13 C			2.48
Celling P. E.	14			31.00 "			4.34
Wall P. E.	10			50.00 "			11.24
2# Conduit	100			1.48 "			1.48
Celling P. E.	8			35.00 "			2.80
Wall P. E.	2			70.00 "			1.44
#100 Celling Box	9			26.80 "			2.41
#100 Wall "	10			22.00 "			2.20
#100 Floor "	3			1.50 C			4.59
				Total	Estimated Labor		33.11
				1.00	Master 34%		11.26
				Total	Actual Labor		44.37
3# Conduit	30				2.80 C		.84
Terminals	14				27.00 "		3.78
Boxes	4				.085 "		.34
1# Conduit	75				3.10 C		2.32
Wires	2				1.11 ea		2.22
Terminals	2				30 "		.76
Boxes	1				.17 "		.17
1 1/2# Conduit	115				4.10 C		4.73
Wires	5				1.87 ea		7.83
Terminals	12				.85 "		6.36
Boxes	2				.43 "		.86
1 1/2# Conduit	16				4.75 C		.73
Wires	1				1.88 ea		1.88
Terminals	4				.65 "		2.60
#14 B. S. R. C.	500				6.00 #		3.00
#12 " " "	300				8.50 #		1.94
#10 " " "	250				5.90 #		1.52
Rug	2				60 ea		1.00
#8 C. S. S. C.	613				7.00 lb		4.00
Rug	3				50 ea		1.50

PRICING SHEET

ESTIMATE NO. 1

JOB Blank

SHEET NO. 5

WORK Light and Power

OF 5

SHEETS

ESTIMATED BY _____

EXTENDED BY _____

CHECKED BY _____

DATE 6-1-25.

DESCRIPTION	QUANTITY	UNIT PRICE	PER	UNIT	EXTENSION	CLASS	UNIT PRICE	PER	EXTENSION
#4 D.B.B.	270	"			48.95	"			13.23
Run	2				1.70	sq			3.40
#1 D.B.B.	75				16.70	sq			1.25
Run	1				.90	sq			.90
100 Amp. 2 Pole 250 V					4.65	"			9.30
60" " " " "	5				2.80	"			14.00
Tap to #2	8				.60	"			4.80
#4 to #2	6				.45	"			2.70
Connect 2 HP Motor	1				5.00	"			5.00
" 7 1/2" "	1				4.15	"			4.15
Cutler 4" x 4" x 5'	1				2.27	"			2.27
4" x 4" x 8'	1				1.67	"			1.67
Fanell's Circuit	1				5.97	"			5.97
1 1/2" x 1 1/2" Exp. Solite	10				17.00	O			3.40
Single Pole Switch and Plates	4				36.00	"			1.20
Receptacle and Plates	4				23.20	"			1.32

ELECTRAGIST estimating sheets used in study of this system by Southern Division of California Electragnists. These sheets are filled in by each man attending the course as the material is taken off by the estimator.

BETTER MERCHANDISING

Dealers and Union Men Join in Seattle Show Large Crowds Inspect Display of All Classes of Electrical Devices Shown During Washington Exposition

By C. A. OSIER

Produced under the auspices of Electrical Workers Union No. 46 and the Electric Club of Seattle, an electrical exposition, one of the largest of its kind ever staged in the Northwest, was recently held in Seattle. Original plans called for a show running from Feb. 16 to 21, but due to popular demand the time was extended three days, the exposition remaining open until midnight Feb. 25.

The show which was brought to a culmination with the election and crowning of Queen Electra, Miss Sylvia Dick, the entry of the Puget Sound Power & Light Company, was unique in many ways. For the first time in the history of Seattle a concerted effort was made to show every possible phase, appliance and machine in the electrical field, the entire electrical industry in Seattle joining forces in the undertaking.

More than fifty Seattle firms dealing in electrical merchandise, maintained booths, exhibiting and demonstrating everything from a curling iron to a power plant. Particular emphasis was laid on the demonstration of all classes of domestic appliances. Radio also played an important part in the display. Several of Seattle's leading radio distributors joined in the exhibition with complete outfits of latest developments. In addition to numerous receiving sets to be seen, radio fans witnessed for the first time broadcasting exhibitions.

The object of the show was two-fold—first, to acquaint the general public with the latest developments in electrical science, reflecting the advance the industry has made; and second, to raise

a fund for the entertainment of some 1,000 delegates to the convention of the International Brotherhood of Electrical Workers that is to be held in Seattle beginning Aug. 17. This convention will draw delegates from all parts of Canada, the United States, Mexico, Panama, Hawaii and the Philippines, and will last from a week to ten days, this year's meeting requiring more time than usual because of a joint meeting of the Electrical Workers' Benefit Association, an inter-insurance society within the brotherhood.

The exposition was held at the Hippodrome and, following a prearranged schedule, the doors were opened at 2 p.m. daily, remaining open until 12:30 a.m. The afternoon program, starting at 2:15, included educational motion pictures showing the development of electricity and its uses, a concert and vaudeville entertainment and closed at 5 o'clock. The evening show, starting at 8:15, featured a vaudeville performance of eight to ten acts, including singing and dancing specialties. From 8:45 to 9:15 there was an intermission to permit visitors to view the demonstrations and inspect the exhibits, this being followed with another show which ended about 10 o'clock. From 10 to 12 dancing was in order, music being furnished by a twelve-piece orchestra.

Special electrical stunts were staged from the different booths each night. In this way the exhibitors were given an opportunity to draw particular attention to their displays.

Originally it was the intention of the management to charge fifty cents admission, but at the exhibitors' request

the charge was cut to twenty-five cents. This charge covered everything—exhibition, vaudeville show and two hours dancing.

Exhibitors were allowed to solicit orders and to make sales and, although it was not the object of the exposition, many of the concerns reported numerous sales made and an unlimited amount of inquiries received.

The men directly in charge of the exhibition were: Frank Gates, manager of the show; Dave Fink, chairman of the arrangements committee; B. F. Gordon, chairman of the joint committee of the Electric Club of Seattle and the Brotherhood of Electrical Workers in charge of the exhibition; A. J. Sears, chairman of the floor committee; R. T. Sinex, consulting engineer of the exhibition; and W. E. Jones, chairman of the committee of the Electric Club of Seattle.

The executive committeemen were: B. F. Gordon, chairman; W. E. Jones, Walter Funfsinn, T. S. Wood and R. T. Sinex. Other committeemen included: Lighting and decorating—A. G. Heller, L. D. Morgan and R. T. Sinex; floor committee—A. J. Sears, chairman; Electric Club of Seattle—W. E. Jones, chairman; L. R. Grant, H. E. Gleason, L. C. Warner, Walter Funfsinn, J. R. Wells, T. S. Wood, J. Zancker, T. W. Reed and B. F. Gordon.

Sixteen Seattle girls, representing twelve electrical firms and organizations, were entered in the popularity contest from which Queen Electra was chosen. Every visitor to the show was entitled to a vote, and the contest was spirited from the opening day.

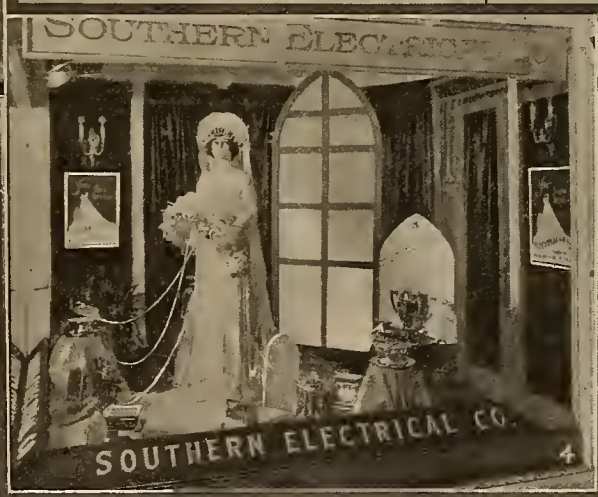
Miss Dick, after being crowned Queen Electra by H. J. Martin, substituting for Mayor E. J. Brown as High Lord Chamberlain of the Kingdom of Invisible Force, was presented with a diamond ring, the gift of the electrical industry.



Two of the exhibits shown during the exposition. Demonstrations of domestic appliances formed an important part of the exposition



WINNING exhibits presented in the June Bride window decorating contest conducted by the California Electrical Bureau. Prizes totaling \$125 were awarded to the firms presenting the displays shown on this page. The photographs are numbered corresponding to the prizes won. (1) Valley Electrical Supply Company, Fresno. (2) Thomas Day Company, Oakland. (3) J. A. Newton Electric Company, Glendale. (4) Southern Electrical Company, San Diego. (5) Westwood Electrical Company, San Francisco. (6) Central Electric Company, Watsonville. A number of other photographs were entered in the contest which was held during the first week in June. The four judges are representatives of leading San Francisco advertising agencies.



NEWS OF THE INDUSTRY

Hetch Hetchy Penstock Lines Ruptured Due to Operating Error

Surges, resulting from the failure of an operator to open a by-pass valve before opening a main gate valve, resulted in injury to three of the four 66-in. lap-welded, steel penstock lines at the new Moccasin power plant of the city of San Francisco on July 30. The ensuing flow of water, mud, trees and other debris littered up the switch and transformer yard and filled the basement of the power house to within a foot of the ceiling before the water could be shut off at the surge chamber. No damage to any of the electrical apparatus was sustained beyond the wetting of the lower section of the four generators. Water crept up until it covered the lower coils of the machines to a depth of about a foot. This necessitated repeating the dry-out process on the generators which had been ready for service but a few days when the accident occurred.

All of the generators had been operating for the purpose of wearing in the bearings, adjusting the control and operating mechanisms and other necessary preliminary adjustments. About three o'clock in the morning the night operator thought that one of the bearings on No. 4 unit was running hotter than it should and accordingly shut down the unit as instructed. Great care has been taken in the preliminary operation of all of the machines to prevent accidents and to watch for any possible difficulties which might arise.

At seven in the morning, when the day crew came on shift, it was decided again to start No. 4 unit for observation. It was at this time that the main gate was opened without first opening the by-pass valve. This action permitted too rapid filling of the lower 50-ft. section of the penstock and set up a series of surges in the penstocks which resulted in the rupture of the No. 4 line up on the hill about 1,000 ft. above the power house. Immediately the other units were shut down, but it was impossible to operate the butterfly valves near the surge chamber for nearly a half hour due to the fact that the electric control had not been completed between the switchboard and the valve operating mechanism. These valves were arranged for temporary operation with an air-drill mechanism and before this could be operated it was necessary to start up the construction-camp air compressor and send a man to the top of the penstock lines to perform the operation. Due to the early hour, this took considerable time.

The split in the No. 4 water line occurred at the weld and was about 10 ft. long. A peculiar feature of the accident as a whole is the fact that some fifteen minutes after the rupture of penstock No. 4, penstock No. 1 also de-

veloped a serious split. No possible connection exists between the two water lines except through the surge chamber farther up the hill. However it is believed that the length of pipe was right for the surges set up to act accumulatively until reaching a magnitude sufficient to rupture the pipe. Had it been possible to shut the upper butterfly valves it is probable that the trouble with the No. 1 line would not have developed.

A 6-in. split also appeared in the No. 3 line which joins the No. 4 line a short distance above the original break. New sections of pipe manufactured especially for the repair job were rushed to the project and installed without further mishap.

Damage to the pipe lines themselves was purely nominal, nothing other than the ruptured sections being harmed seriously. One or two of the concrete saddles were slightly injured due to the sudden later movement on the pipe when the water hammer occurred. The heavy and prolonged flow of water washed all of the top soil away from the anchors in many places, but caused no damage whatever to the anchors. A section of the Hetch Hetchy railroad was washed out and a section of the tram line adjacent to the penstocks was washed out also. Aside from this and the debris washed into the power house and bus yard no damage other than as set forth occurred. The total cost of replacing the damaged pipe sections, replacing the railroad and the tram line and of cleaning up the power house and bus yard amounted to about \$25,000. Due to the fact that arrangements were not completed for the delivery of power to the Pacific Gas and Electric Company at Newark, no loss in revenue resulted from the accident. No personal injuries were sustained.

Copco No. 2 Plant Is Dedicated Formally on July 5

Formal dedication of the Copco No. 2 plant of The California Oregon Power Company was conducted in the presence of approximately two thousand customers, stockholders, business men and bankers on July 5. Following the opening ceremonies people from all sections of northern California and southern Oregon were the company's guests at a luncheon.

The plant representing an investment of \$4,000,000, is located on the Klamath River in northern California about a mile below Copco No. 1 plant and a few miles south of the Oregon-California border. Two 15,000-kw. vertical type generators, which are driven by two 20,000-hp. turbines, operating under a

head of 140 ft., are installed in the new plant.

A long term contract with the Pacific Gas and Electric Company provides for the sale of a large portion of the output to that company. For the delivery of this energy a 77½-mile 110-kv. single circuit, wood pole, transmission line has been constructed, connecting the plant with the lines of the Pacific company at Delta, Calif. The plant also is tied in with the California Oregon company's system.

Interconnection in Oregon Will Close Transmission Gap

Work is under way by the Portland Electric Power Company, Portland, and the Mountain States Power Company, Albany, Ore., which will close, about Oct. 15, 1925, one of the two remaining gaps in the transmission systems between the Canadian and Mexican borders. The gap to be closed is that about eighteen miles in extent between Salem and Independence, Ore. Formal announcement of this significant step in interconnection in the Northwest was made recently on completion of the contractual provisions of the tie-in between the two companies, which, in general, provide for an interchange of current mainly for emergency purposes in any amount up to 7,500 kva., the capacity of the connecting auto-transformer.

The actual point of contact between the systems of the two companies will be at a new steel switch yard under construction by the Portland Electric Power Company at West Salem. This structure is designed with positions for four radiating lines: one for a tie line with the Portland company's steam plant at Salem; one for the Southern Pacific's electric railway feeder; one for the new 57,000-volt transmission line from Portland to Salem, now under construction by the Portland company; and one for the new 66,000-volt transmission line of the Mountain States Power Company from Independence. The 7,500-kva. auto-transformer will be located at this switch yard between the last two lines to compensate for the difference in transmission voltages of the companies. This transformer as well as switching and protection equipment incident to the tie-in will be installed by the Albany company.

Power Company Buys Dam Site.—

One of the first steps in the development project planned by the Feather River Power Company, San Francisco, was made recently when the company completed negotiations for the purchase of the Jones estate, known as Buck's Ranch, in Plumas County, Calif., according to press announcements. The property will serve as the site of a proposed dam to be erected on Buck's Creek that will impound 110,000-acre-ft. of water.

Report on Columbia River as a Waterway Issued by Portland Club

A comprehensive report on the "Upper Columbia River as a Waterway," with respect to its three possible uses, navigation, irrigation, and power development, has been issued by the City Club of Portland through a committee composed of L. A. Andrus, trust officer for Strong & McNaughton, chairman, L. K. Hodges, The Oregonian, and F. H. Murphy, illuminating engineer, Portland Electric Power Company. The report, which is exhaustive, has been divided into four main divisions: (1) a summary of conditions to be considered in solving the problem; (2) conclusions as to principles which should govern development; (3) recommendations that the City Club take action along certain lines; and (4) detailed information on which conclusions and recommendations are based.

In presenting the problem, the report says:

The upper Columbia and its chief tributary, the Snake, drain 252,000 of square miles of sparsely populated agricultural land, a territory in which there is only one large city above Portland and that located on neither stream, in which there is practically no manufacturing, except the pine lumber industry, and in which the extractive industries are as yet of minor importance.

The problem pertaining to the relation of the irrigation use of the river to the power use is expressed as follows:

The undeveloped arid lands bordering these streams lie at such elevations and distances and the contour of the valleys is such that gravity canals for delivering water from these rivers are not ordinarily feasible and most of these irrigation projects can be watered only by means of pumping plants. Fortunately, the flood period of both streams coincides with the period of maximum demand for irrigation as well as with the time when the secondary, or flood water, power of any power plant is the greatest.

Recognizing that in any work for improving navigation conditions or developing power the most expensive structure, the dam, is common to both, the report states that "such improvements can be built most economically when built concurrently," and continues as follows:

Canalization and power development are thus brought into being together, thereby providing a transportation artery on which may be carried the products from the expenditure of the power.

Power developments on these rivers result in the generation of blocks of power of such size as to be unwieldy and unless there be a demand for a considerable proportion of the possible primary power of any project at the inception of the development, the carrying charges during the early years will make the project commercially impracticable.

It has been estimated that the cost of canalization of the Columbia to Priest Rapids and of partial canalization of the Snake to Lewiston, with power plants at each dam, would be \$175,000,000. There could be generated almost 1,000,000 primary horsepower at these power plants.

Among the conclusions of the report, of which the first states that canalization only will make the river a factor in the transportation system of the Columbia Basin, and that power development will assist in promoting the growth of contiguous territory, is one recognizing the necessity of having a market for the power developed, and is expressed in this language:

That a demand for a considerable part of the primary power generated at each improvement project must be in existence before the project is begun by private capital. That this condition can be brought about by locating some industry requiring large quantities of power at or near each dam-site concurrently with the

building of the dam or by developing a market within practical transmission distance of the dam-site.

The stand taken by the report on the question of government ownership is clearly stated in its fifth conclusion as follows:

That federal, state or municipal ownership and operation of the power plants at the various dams is most undesirable, and that these developments should be carried out by private capital under licenses from the Federal Power Commission, the federal government paying the cost of those structures useful as aids to navigation.

The recommendations in the report are of a general character urging primarily, "the preparation and adoption of a comprehensive plan for such improvements based on principles laid down in our conclusions." The report does, however, endorse the Priest Rapids development, the only one now in contemplation on the upper river, as follows:

The published statements concerning the plans for the Priest Rapids project, for which federal license has recently been issued, conform with the principles laid down in this report and provide an excellent illustration of the type of development which should be encouraged on the river below.

The greater part of the report is taken up in a presentation of detailed information on which its conclusions and recommendations are based. This material includes a survey of conditions existing on the two rivers, with respect to the characteristics of the different rapids, the distance, the depth and the fall between points, and the government improvements to aid navigation. In addition this portion of the report contains a survey of the commerce developed, the tonnage originating in contiguous territory, landing facilities, rail and highway competition, irrigation projects, power sites and suggested improvements. It also summarizes the Federal Water Power Act, and the report of the Columbia River Board to the Federal Power Commission of 1921.

Fourth Unit Big Creek Power House No. 1 Completed.—Installation of the fourth unit at Big Creek No. 1 power house of the Southern California Edison Company was completed June 8, just thirty days ahead of schedule. With the addition of this 28,000-kv. unit Big Creek No. 1 power house now has a total generating capacity of 73,000 kw. It is of interest to note that the last four sections of pipe for the penstock did not arrive at the job until June 3, yet water was turned through at 8:32 a.m. June 8 and the machine was put on the line at 5:52 p.m. the same day.

Feather River Power Sites Sought.—The Feather River Power Company, San Francisco, has applied to the California Division of Water Rights for permission to divert 105 sec.-ft. of water from Grizzly Creek tributary to the North Fork of the Feather River, Plumas County. It is proposed to develop 29,627 theoretical horsepower. Another application requests 40 sec.-ft. from Milk Ranch Creek and three unnamed tributaries of the North Fork of the Feather River, Plumas County, for the development of 11,286 theoretical horsepower. Applications covering these projects also have been filed with the Federal Power Commission.

Great Northern Cascade Grade to Be Electrified

Further electrification of the motive power of the Great Northern Railway was undertaken recently when an order was placed by that company with the Westinghouse Electric & Manufacturing Company for the building of four locomotives. These electric locomotives will be utilized to haul both passenger and freight trains from Skykomish, Wash., to Cascade Tunnel station at the east portal of the three-mile tunnel through the Cascade Mountains, a distance of twenty-four miles.

For twenty-five years trains have been moved through this three-mile tunnel by electric power. The present generating station, located in the Tumwater Canyon of the Wenatchee River, is ample to carry the additional load of the new electrification, hence the only construction involved is that of transmission line, trolley line and the necessary incidentals. The total cost of the job, including locomotives, is expected to be \$1,000,000.

One of the unusual features of this installation is the fact that the trolley voltage will be 11,500, single phase, alternating current. This will feed a 1,500-kw. motor-generator set carried on the locomotive and which in turn will supply the four driving motors with energy at 600 volts, direct current. The present four locomotives are operating at 6,600 volts, three phase, alternating current. In order to make these present units available for service when the new system is installed, phase converters will be installed to change the 11,500 volts single phase to 6,600 volts three phase.

A secondary locomotive which takes its driving energy from the main locomotive is used in conjunction with the main locomotive for the purpose of moving heavy freight trains over the 2.2 per cent grades of the Cascades. One of these combined units is capable of moving a 1,500-ton train from Skykomish to Cascade Tunnel station at a speed of nine miles per hour while two of the units can handle a 3,000-ton train. At present three Mikado-type steam locomotives are required to move a 2,500-ton train over the division. The new electric locomotives will have the same wheel arrangement as the Mikado-type steam units now in use.

The use of electricity on this section of the road will make more attractive one of the most scenic sections of country along the right-of-way. Special open-top observation cars then may be operated without the smoke nuisance incident to the steam locomotives.

Survey of San Rafael River in Utah Is Being Made

A survey of the San Rafael River in Utah, for the land classification branch of the Geological Survey is being made by R. W. Burchard of Washington, D. C., and Ralf R. Woolley of Salt Lake City, U.S.G.S. engineers.

A profile will be run from the forks, east of Castle Dale, Utah, and from the lower end of the canyon to join the Green River survey. This is the last survey to determine the possibilities for power and irrigation in the upper Colorado River basin, upon which Mr. Woolley will base his report to the Department of the Interior. Surveys already have been made of the Green River, the Yampa River and the Colorado River.

Governor Pinchot Condemns State Regulation of Utilities

Stating that the control of the "electric monopoly" was the most pressing economic question before the people of the United States, Governor Gifford Pinchot of Pennsylvania, speaking before the Commonwealth Club of San Francisco on July 6, contended that the present system of state regulation of electric utilities was inadequate. Talking principally upon "Giant Power" Governor Pinchot claimed that under the "Giant Power" plan presented in his state, the interstate transmission of electrical energy would be regulated by state regulatory bodies working cooperatively whereas under what he called the "superpower system" state bodies had no control over interstate transmission.

Governor Pinchot is in disagreement with Secretary of Commerce Herbert Hoover's conclusions in his address before the Public Policy Committee meeting at the recent N.E.L.A. convention in regard to the adequacy of the state regulatory bodies. Calling attention to the condition as he sees it in Pennsylvania the speaker stated:

First as to service. Ninety-four per cent of the farms in Pennsylvania are denied public electric service. For more than a year the companies have unitedly opposed our efforts to better this situation. Their influence defeated at the last session of the legislature two bills authorizing farmers to combine and purchase current wholesale from the power companies at cost plus a reasonable profit, putting all the risk and cost of distribution on the farmers themselves.

Second as to discrimination in rates: the Philadelphia Rapid Transit Company in 1922 paid for steam generated electricity an average of 8.3 mills per kilowatt hour. In the same year the average estimated price paid by domestic consumers in Philadelphia was 74 mills or about nine times as much.

As to the fairness of rates as a whole: at present a public service commission cannot decide what is a fair return without first making a valuation of the company's property. And when a valuation is once made it must be made all over again every time the question of a fair return comes up.

It is a very costly procedure. The new York Edison Company has already spent \$1,850,000 in preparing for hearings before the Public Service Commission and the total cost to the company alone probably will be \$3,000,000, all of which the consumers ultimately have to pay.

Mr. Hoover thinks that regulation as now practiced results in rates that, as a whole, are fair. In proof of this he says that the total of interest and dividends paid in 1924 was only about 6 per cent of the "estimated valuation."

Please note the word "estimated." Against his estimate I set a fact. The Philadelphia News Bureau, published by the same concern that publishes the Wall Street Journal, in its issue of May 27 last, computed the profits of ten companies by the increase in the stock market value of their stocks from the low point of 1924 to that date. After making full deduction for all new stock issued in exchange for new properties it said: "The balance of some \$282,000,000 represents the real increase in stock market valuation, amounting to some 180 per cent on the average in less than 18 months." Mr. Hoover talks of 6 per cent a year. The Wall Street Journal's publisher shows us more than 10 per cent a month.

The Pennsylvania electric companies by their united opposition defeated a bill in the Pennsylvania legislature this winter that would have done away with the futile, wasteful, and impossible valuation procedure while guaranteeing to well managed companies a rate of return high enough to attract the vast quantities of new capital needed for expansion.

Third as to financing: The Pennsylvania Public Service Commission has no authority to control security issues, and the electric companies at the last session defeated a bill to give it that authority.

Governor Pinchot's suggestions for supplying adequate regulation where interstate transmission of power is concerned includes the formation of pacts between states whereby they shall cooperatively regulate the utilities. He

made no statement as to a plan for the correction of the regulatory body functioning in Pennsylvania.

Postpone Valuation of Property in Los Angeles Area

The valuation hearing scheduled for July 6 on the distribution lines of the Southern California Edison Company in the fourteen newly annexed sections of Los Angeles was postponed until Nov. 2 by the California Railroad Commission. This delay will give engineers for the commission time to establish a true value for the property.

The communities in which Los Angeles has made application to acquire the equipment are: Melrose, Sawtelle, Rimpau, Evans, Ambassador, Laurel Canyon, Hyde Park, Eagle Rock, Vermont, Lankershim, Providencia, Cienega, Annandale, Wagner and Fairfax.

Denver Electrical League Makes Plans for Coming Year's Activities

No innovations or unusual departures will be injected into the program of the new fiscal year of the Electrical Cooperative League of Denver. After four years of continuous activity, members of the advisory board decided that the fifth year, which started July 1, should conform to the same schedule with a similar appropriation of \$13,500 with which to carry on the regular work of the organization.

Plans for the fifth year were completed upon approval of the report submitted by a special program committee which included in its recommendations early consideration of the establishment of the Red Seal activity in Denver and suburban towns, providing conditions were found to be opportune and in harmony with the present system of field work maintained by the league.

More emphasis is to be given social and entertainment features for the benefit of the rank and file of the industry, but not, according to the report, to the extent that a system of social membership will be established inasmuch as the Denver organization has always confined its membership to individuals and firms on a sustaining basis. The first major activity of a social nature will be the league's fifth annual picnic and outing scheduled to be held at Elitch's Gardens, near Denver, Aug. 11.

A number of the board members have expressed themselves as being of the belief that the pioneering period of the league work has passed and that a constitution or more definite set of working rules be established for the future guidance of the league. The original organizers specifically refrained from establishing any by-laws at the outset because of changing conditions, it is said.

Continuation of the advisory or consulting service without any let-up was recommended to the organization as was the necessity for close personal interest in the problems of the industry on the part of responsible company executives rather than to delegate matters of this kind to individuals not having the required responsibilities. Attendance at meetings was also stressed in the committee report.

Before the close of the old fiscal year, June 30, over 75 per cent of the budget

San Francisco Files Petition Asking for Rate Reduction

Reduced rates for electric service are asked in a petition filed by the City of San Francisco with the California State Railroad Commission. Charging that both the Pacific Gas and Electric Company and the Great Western Power Company are earning in excess of the eight per cent prescribed by law, the petition asks for a general rate hearing in San Francisco.

The petition sets forth that in 1922 the revenue of the Pacific Gas and Electric Company was \$21,483,700 and in 1924 it was \$26,612,088 and that the Great Western Power Company earned \$5,330,000 in 1922 and \$7,322,562 in 1924. The petition further states that the 1922 revenue represented the allowable eight per cent return but that the 1924 revenue was in excess of that rate.

for the new year was subscribed, according to S. W. Bishop, executive manager of the league, a position which he has held since the organization was formed in 1921.

A. C. Cornell, manager of the Western Electric Company in the Rocky Mountain region, was unanimously elected chairman of the new board which took office July 1. Vice-chairmen designated thus far are Ernest P. Kipp, western sales manager of the Hazard Manufacturing Company for the manufacturers and A. E. Bacon, manager of the electrical department of the Mine & Smelter Supply Company, for the jobbers. E. A. Scott of Scott Brothers Electric Company, was re-elected secretary. Dean D. Clark, Denver commercial manager of the Mountain States Telephone & Telegraph Company, again was named treasurer.

The advisory board members designated by the respective divisions to serve for the new year are:

Manufacturers—Ernest P. Kipp, western sales manager, Hazard Manufacturing Company; Robert Miller, district manager, General Electric Company; L. M. Cargo, district manager, Westinghouse Electric & Manufacturing Company; K. L. Francis, president and general manager, Albert Sechrist Manufacturing Company; and Fred E. Staible, president, Wesco Supply Company.

Jobbers—A. C. Cornell, Rocky Mountain manager, Western Electric Company, Inc.; J. C. Davidson, manager, electrical department, Hendrie & Bolthoff Manufacturing & Supply Company; A. E. Bacon, manager, electrical department, Mine & Smelter Supply Company; John J. Cooper, manager, Mountain Electric Company, and B. C. Watts, president, B. C. Watts & Company.

Contractor-Dealers—W. A. Guscott, E. C. Headrick, E. A. Scott, D. D. Sturgeon, and W. R. Kaffer of the Electrical Supply & Construction Company.

Public Utilities—O. L. Mackell, G. B. Buck, Clarence Keeler, F. F. McCammon, and R. G. Gentry, all of the Public Service Company of Colorado and Dean D. Clark, Denver commercial manager, Mountain States Telephone & Telegraph Company.

The annual report of the league covering activities of the past year and plans for the new one, is now on the press and will be distributed shortly. Copies will be mailed to anyone that is interested. One of the interesting features of the financial end of the report is the balance of over \$500 resulting from economies of operation not contemplated in the original budget.

Information Concerning Appliances Is Contained in New Hand Book

A 30-page hand book, known as the "Hand Book of Electric Appliance Information" to be placed in the hands of all in the electrical industry that come in contact with the public, has been issued by the California Electrical Bureau. The book contains useful information dealing with the operation, care, adaptability and cost of operation of all classes of appliances. Home lighting also is discussed at some length.

The text of the booklet, which is written so that the layman can understand it easily, starts with a description of the uses of the convenience outlet, and shows how with the use of this device electrical appliances may be used more easily. The common electrical terms are explained in language that may be understood by the average housewife. This explanation naturally leads into a description of the methods of metering the current used in the home. Meter reading is explained, as well as the process of figuring monthly bills for service.

Several paragraphs are devoted to instructions concerning the general care of electrical appliances.

In discussing the appliances used in the modern home these devices are grouped according to their useage. Those taken up first are table appliances. The advantages of each of five classes are presented together with a description of the various types that are now on the market. The average cost of operating the appliances is presented also. Under kitchen appliances the book presents the best selling points of the electric range, water heater, dish washer, hot plate, cream whipper, utility motor, ventilating fan, ice cream freezer and refrigerator. The time and labor saved the housewife together with average costs for operation are incorporated in the descriptions of these appliances. The clothes washer, ironing machine and electric iron, which are classed as laundry appliances are discussed in much the same manner. General household and miscellaneous appliances are described and their advantages portrayed in the next section of the hand book. Considerable attention is paid to electric fans and air heaters, the various types of the latter being discussed at some length.

"Proper lighting," says the hand book, "is the concern of everyone that lives in a home." To assist in placing better lighting in the home eight pages of the book have been devoted to this important subject. Gloom and glare are defined and then each room of the house is taken and suggestions made as to the proper method of illuminating it for the benefit of the entire family. Wattages of lamps in various fixtures are recommended as well as total wattages for every room.

While the hand book has been prepared primarily to assist the salesman of leaders (both electrical and non-electrical), jobbers and central stations, is suited to distribution among the general public. The hand book was prepared by a committee headed by P. H. Booth.

Copies of the book have been placed in the hands of all dealers, jobbers and managers of central station company commercial departments for distribution to their salesmen. Additional copies

may be obtained prior to July 31 at a cost of 10 cents each, by addressing the California Electrical Bureau, 447 Sutter Street, San Francisco.

Rebuilding of Santa Barbara Is Being Accomplished

Splendid progress in the task of removing every trace of the devastating earthquake which killed fourteen persons and caused a property loss of approximately \$13,000,000 in Santa Barbara, Calif., between 6 and 10:30 a.m., June 29. Dust from the falling buildings had hardly settled before steps had been taken by various California civic organizations together with banking institutions to finance the rebuilding of the city.

Actual damage was confined almost entirely to the business district of the city, the residential section comparatively suffering very little. Danger of fire from short circuits made it necessary to prohibit the use of electricity in the stricken city until a thorough inspection had been made in all houses, but street lights in the business area were on at 7 p.m. the day of the shock. Emergency service to the two newspapers, one hospital, and one ice plant was available within a few hours after the quake. Broken gas mains made it impossible to do any cooking except such as could be done over open fire built on the lawns.

Although the dam impounding Sheffield reservoir, one of Santa Barbara's main water supplies, went out in the quake, the water was bypassed from the tunnel above the reservoir and the city water system is now back to normal. No fires of any consequence were caused by the tremor.

According to official estimates, the Southern California Edison Company which serves Santa Barbara with electricity sustained a loss of approximately \$15,000. The Santa Barbara substation building which the company had planned to wreck in 1926 and replace with a modern station was destroyed completely. All of the equipment of this station was of the out-of-doors type with the exception of the motor-generator sets used to furnish power for the street railway. Aside from the breaking of a bushing on one of the transformers and the slight displacement of another, this out-door equipment escaped injury. Temporary switches were erected back of the out-door substation and new feeder lines connected to the distributing circuits which were not damaged anywhere in town. Within the building, the motor generator sets received a shower of mortar and bricks but were found to be unharmed and ready for use after overhanging walls had been demolished.

Profiting by the work done for them by the earthquake in wrecking the old building, officials of the company decided to advance the date for starting the work on the new substation about one year, and the necessary appropriation of a quarter of a million dollars was authorized immediately. An emergency crew of more than one hundred men was sent to Santa Barbara and excavation work on the new site which the company had previously purchased at

the corner of Gutierrez and Quarantina Streets was started at once.

The substation being built will not only be the terminal of the 60,000-volt lines from Saticoy Substation, but will likewise be the distributing point for all light and power circuits supplying the city and its environs. The station will have a 60,000/10,000/4,000-volt transforming capacity and both building and equipment will be of the most modern design and type.

The Santa Barbara & Suburban Railway, a subsidiary of the Southern California Edison Company, suffered slight damage and service was restored July 4. It was necessary to set 75 poles on State Street to support the overhead trolleys which were formerly supported by buildings damaged by the earthquake.

Reports from the Montana Power Company state that in the recent tremors felt there no appreciable damage was done to its properties. A few poles fell due to the shock.

New Line of Lamps Announced by Mazda Manufacturers

The Mazda lamp manufacturers have announced the first unit of a new line of Mazda lamps. The principal feature of this new line of lamps is the inside frosting of the bulb which leaves the exterior surface smooth so that it will not collect dust or dirt. The inside frost is an excellent diffuser yet absorbs little more than a clear lamp. For years lamp manufacturers have tried to produce lamps with a frosting inside the bulb but always have been unsuccessful until the recent discovery by research engineers.

As the new line of lamps will replace both round and straight side bulbs, a composite bulb, pear-shaped, has been adopted. Due to improvement in the filament and other features of construction, the lamp is more rugged than previous lamps for general lighting service. The new line represents not only better light for less money to the public, but also embodies a program of standardization whereby the new lamps in possibly five sizes eventually may replace more than forty various types and sizes of present lamps.

Index to Volume 54 Ready for Distribution.—Index to Volume 54 of the Journal of Electricity, covering issues from Jan. 1, 1925, to June 15, 1925, has been published and is ready for distribution. Copies of the Index will be mailed to any subscriber of the Journal of Electricity upon application to Circulation Manager, Journal of Electricity, 883 Mission Street, San Francisco.

Power Site on Clearwater River in Idaho Sought.—The Inland Power & Light Company has applied to the Federal Power Commission for a preliminary permit covering a project on the Clearwater River in Nez Perce County, near Lewiston, Idaho. The dam is to be located two miles above Lewiston and the power house is to be on Clearwater Slough. This application conflicts with one of the city of Lewiston, filed Dec. 17, 1924. It is understood that the city will cancel its application due to recent agreements. (Journal of Electricity, April 15, 1925, p. 297.) The Inland company is affiliated with the Pacific Power & Light Company of Portland.



News of the Electragists



Reception committee of the San Diego Electragists which met the delegates at the boat and transported them to the hotel

Divisional Meeting of Electragists at San Diego Successful

Practical problems facing the contractor-dealer members of the electrical industry including merchandising and contracting, with special emphasis on the Red Seal Plan were among the subjects discussed at the first quarterly meeting of the California Electragists, Southern Division, which was held at the Hotel Maryland, San Diego, on June 27. The S.S. Ruth Alexander carried 165 delegates and their wives and friends from Los Angeles harbor to San Diego. A number also made the trip by automobile.

The delegates were entertained with sight seeing trips, golf, a box lunch, baseball games between the jobbers and manufacturers and the electragists, and an organ recital. In the evening a banquet and dancing was enjoyed at the hotel.

Merchandising Session

The merchandising session was held in the morning and was presided over by O. N. Robertson, Robertson Electric Company, Santa Ana.

A. M. Fitch of the Harrison-Fitch

Electric Company, Pomona, presented a paper on the electrical contractor-dealer with respect to merchandising problems of today. He stated the large amount of business being diverted to the hardware, department, and specialty stores presented a problem which demanded the best thought and cooperation of all interested parties if the contractor-dealer as now organized was to survive. As it is a rare man who makes a good merchant and a good contractor, he said it is usually advisable for a contractor-dealer to handle the particular phase of the business for which he is best qualified and to associate someone with him to handle the other branch. The subjects of credit and time-payment plans were discussed as well as the addition of other lines of merchandise. Mr. Fitch stressed the importance of friends as a permanent asset in receiving repeat orders and recommendations to others.

D. D. McFarlane, Newbery Electric Corporation, Los Angeles, stated that contracting and merchandising should

be treated as two separate departments of the business. He spoke of the importance of proper display and the correctness of statements regarding the operation of various machines. He stated in their business direct mail advertising had been substituted for house-to-house canvassing.

H. B. Harris, Listenwaller & Gough, Los Angeles, presented a paper on the problems facing the contractor-dealer. He asserted that the contractor-dealer was the logical outlet through which the buying public should be served. As the contractor-dealer has the first contact with the ultimate purchaser of household devices, Mr. Harris said that a client for his business is created if the contractor conducts himself properly when making the installation in the building. He stated the time-payment plan was good business from the standpoint of clientele-building in that the frequent contact presents an opportunity to acquaint the customer with the many facilities of the contractor-dealer for serving him. He said great care must be used in the selection of reliable merchandise.

A. E. Holloway, San Diego Consolidated Gas & Electric Company, presented a paper on the contractor-dealer. He first discussed the subject from the contractor's standpoint. Mr. Holloway stated that inadequate wiring is usually specified because of the lack of consultation with any electrical man before the time of calling for bids. In his opinion the big problem facing the contractors is the building up of the job while it is in the formative stage as extra outlets, switches, etc., added at that time change the job from an unprofitable one to a profitable one. He urged that greater effort and better salesmanship should be expended in closing wiring jobs.

Taking up the dealers' problem, Mr. Holloway first discussed the necessity of selling proper lighting equipment instead of merely a fixture, and spoke of the opportunity of selling appliances to a customer at the time of selling lighting fixtures. In speaking of the problem of central stations merchandising electrical appliances, Mr. Holloway said, "It seems that throughout the East and Middle West, the central stations are all going into the merchandising business, and reports come from the dealers and central stations, that the dealer is doing a better business with the central station on the job than when the central station was not merchandising. I can see where such might be the case if the central station went into the appli-



Left, Electragists baseball team; right, jobbers and manufacturers team. After a hotly contested game, the jobbers and manufacturers were declared to be the winners

ance business on a legitimate scale and acted as a balance or stabilizer for prices, combined its advertising along proper lines and cooperated with the other dealers in the community. If a central station goes into the appliance business and operates along legitimate lines, I can see where there is opportunity for greater volume of business for everyone."

The following committee of five was appointed to make a study of the prob-



Frank McGinley, Harbor Electrical Company, ready for action

lem of merchandising electrical appliances: C. A. Rowley, The McNally Company, Pasadena, chairman; Carl Heilbron, Southern Electrical Company, San Diego; J. J. Farley, J. J. Farley Electric Company, Fullerton; D. D. MacFarlan, Newbery Electric Corporation, Los Angeles; and A. M. Fitch,



Umpire W. L. Frost, Southern California Edison Company, calls a strike

Harrison-Fitch Electric Company, Pomona.

O. N. Robertson, Robertson Electric Company, Santa Ana, was elected chairman of the merchandising section of the California Electragists, Southern Division, for the ensuing year.

Regular Session

Vice-President Frank McGinley, Harbor Electrical Company, Wilmington, presided over the regular session which was held in the afternoon. Executive Secretary C. J. Geisbush gave his report in which he outlined the history of the organization. He said the work up to the present time had been concentrated on the education of the members teaching them the electragists system of estimating. The next large job to be undertaken is the Red Seal campaign.

A committee was appointed to draw up a resolution commending Harry Walker, H. H. Walker Company, Los Angeles, and Clyde Chamblin, California Electrical Construction Company, San Francisco, for their unselfish service in the interests of the California Electragists.

Harry Harper, Western Electric Company, Los Angeles, next addressed the members. He stated there was plenty of business for everyone and the people would be served, but the question was whether or not a profit would be made by those handling the business. He asserted that the jobbers in Los Angeles felt that the contractors had adopted a practical plan or organization.

Red Seal Plan Discussed

Mr. Harper also discussed the Red Seal Plan, which is a program to promote adequate wiring for convenient electric service in the home. It will be administered from the Society for Electrical Development by the California Electrical Bureau through the California Electragists. The three main elements of the plan consist of the establishment of minimum requirements as to adequacy, in terms of lighting, switch and convenience outlets, special circuits, etc.; identification of the homes which at least satisfy the minimum requirements by means of the Red Seal em-

blem; and the popularizing of the Red Seal emblem as the symbol of adequate wiring.

W. L. Frost of the Southern California Edison Company, Los Angeles,



Too many hands caused trouble

stated that the California Electrical Bureau had been reorganized and would work with the California Electragists.

H. E. Sherman, Jr., Illinois Electric Company, Los Angeles, addressed the meeting on the subject of confidence. He stated the problems of the electragists called for good sound thinking and a lot of hard work. He spoke of the place of confidence in association activities and pointed out some of the pitfalls which must be avoided in any successful organization.

A communication was read from Victor Lemoge, president of the California Electragists, asking for a nomination from the Southern Division for the presidency of the California Electragists. Harry Walker, H. H. Walker Company, Los Angeles, was unanimously nominated.

The success of the convention can be largely attributed to the untiring efforts of J. F. Zwiener, Fred L. Edwards, Mrs. Walter C. Wurfel, and C. J. Geisbush.



Left, H. E. Sherman, Illinois Electric Company, captain of the jobbers and manufacturers baseball team, and C. J. Geisbush, California Electragists, exchanging greetings with the loving cups awarded them



An artist's conception of the heavy traffic which will be caused by the arrival of delegates to the Electragists convention at Eureka, August 6-8

California Electragists Plan Interesting Meeting

Reservations are being received daily for the annual convention of the California Electragists, Northern Division, which is to be held at Eureka, August 6-8, according to Victor Lemogue, president. They must be made through the San Francisco office at 522 Call Building, and must be accompanied with the registration fee of \$5 per person.

The program which has been planned includes the general open meeting, an auto tour up the coast for the ladies, a day in the logging woods with a trip to the electric mills, golf, a baseball game between the jobbers and manufacturers and the electragists, a banquet and dancing. Complete details were given on page 37 of the July 1 issue of the Journal of Electricity.

Seattle Electrical Code to Be Redrafted Immediately

Seattle is to have a new electrical code to replace the existing code which is obsolete in many respects. The council recently approved a request of the building department for authority to redraft the code, and plans have been completed for such work. Robert Proctor, city superintendent of buildings, states that the committee which he has appointed will strive for the maximum of safety at a minimum of cost to the builder, in preparing the new code, which will require about three months time to complete.

The following committee has been named: J. G. Maitland, representing the Electric Club, chairman; M. P. Hottel, building department, secretary; A. H. Patton, Washington Surveying & Rating Bureau; T. W. Stevens, city lighting department; A. N. Potter, Building Owners' & Managers' Association; J. R. Jewett, I. B. Electrical Workers No. 46; M. T. Crawford and L. O. Snow, Puget Sound Power & Light Company; R. L. Laing, city fire marshal; Robert Proctor, city building superintendent; A. Nicholson, W. C. Clothier and E. Morrison of the city building department.

Electrical Development Society Directors Appointed

Directors of The Society for Electrical Development appointed at a recent meeting of the board of directors to serve for one year each comprised the following:

Representing central stations—H. A. Wagner, president Consolidated Gas & Electric Light & Power Company of Baltimore, Baltimore, Md.

Representing manufacturers—H. B. Crouse, president and treasurer Crouse Hinds Company, Syracuse, N. Y., and Herman Plaut, president L. Plaut & Company, New York City.

Representing jobbers—W. I. Bickford, secretary-treasurer Iron City Electric Company, Pittsburgh, Pa., and N. G. Harvey, president Illinois Electric Company, Chicago.

Representing contractor-dealers—C. L. Chamblin, president California Electrical Construction Company, San Francisco, and W. A. Jackson, president W. A. Jackson Company, Chicago.

Representing at-large group—J. R. Crouse, Crouse, Tremaine Kulas Company, Cleveland; H. L. Doherty, president Henry L. Doherty & Company, New York City; C. W. Price, chairman of board of directors, International Trade Press, New York City; E. W. Rockafellow, vice-president National Pole Company, New York; C. A. Ward, president Ward Motor Vehicle Company, Mt. Vernon, N. Y., and James H. McGraw, president McGraw-Hill Company, Inc., New York City.

L. A. G. and E. Plans Extension Program.—The Los Angeles Gas and Electric Corporation expects to spend approximately \$8,000,000 on additions to its generating, transmission and distribution systems during the balance of the year. One-half of this sum is to be expended on the new Seal Beach station, together with necessary substations and transmission lines to handle the additional power generated. The balance of the money is to go toward general extensions to the distribution system, including the purchase of 24,800 meters.

Book Reviews

ELECTRIC RAILWAY TRANSPORTATION

By HENRY W. BLAKE and
WALTER JOHNSON

449 pages, 121 figures. \$5. McGraw-Hill Book Company, Inc., New York, N. Y.

Books concerning the transportation methods, practices, and problems of electric railways are comparatively scarce. Electric railway engineering has been treated in a number of text books, but the purely transportation phase of this most important public utility has had very little treatment in book form. The author points out that the number of men engaged in the transportation department of an electric railway greatly exceed in number those in the engineering department and that there is a possibility for greater financial loss through faulty practice.

This book, originally published in 1917, has been revised in the edition of 1924 to include material covering the problems of bus operation by electric railways; the use of the Birney one-man car; organized safety methods, and the problems arising as a result of the present day necessity of applying merchandising methods to all electric railway transportation.

The book begins with chapters on the subject of "Organization;" "Adjustment of Service to Traffic;" a chapter covering "Accelerating Traffic Movement Along the Lines and on the Car." Then follow three chapters devoted to "Car Types in Relation to Traffic;" "City Time Tables;" "Interurban Schedules and Dispatching;" "Fares, Fare Collection Practice and Devices" are then treated followed by chapters on "Public Relations and Promotion of Passenger Traffic."

This last phase of the work is treated in great detail in a chapter covering "Traffic Signs for Cars," "Station and Road," methods of furnishing information for the public. The latest innovation and addition to the electric railway, and one which is given more prominence daily is covered in the chapter entitled "Motor Bus Operation by Electric Railways."

The book concludes with five chapters dealing with the personnel of electric railway operatives under the head of "Selection and Training of Men," "Wages and Wage Agreements," "Employee Relations," "Discipline of Trainmen" and "Forms of Extra Pay."

The author states plainly that the book is intended in no way to be a compilation of the practice of all companies on the various subjects treated. References are made to European tramway practice relating to the period before the World War.

This book treats the subject of Electric Railway Transportation in a very thorough manner and should prove most valuable for executives and engineers having charge of electrical railway transportation systems.

E. R. S.

Meetings

Portland N.E.L.A. and A.I.E.E. Elect New Officers

At a recent meeting of the Portland sections of the N.E.L.A. and A.I.E.E., held May 20, officers of both sections were elected for the coming year. In the N.E.L.A. section new officers are as follows: chairman—W. W. Sansom, office manager, commercial department, Portland Electric Power Company; vice-chairman—D. F. McCurrach, rate engineer, Northwestern Electric Company; secretary—V. H. Moon, appliance sales superintendent, Pacific Power & Light Company; treasurer—J. C. Plankinton, sales manager, Northwestern Electric Company. Two new members of the executive committee were chosen as follows: E. R. Nigh, superintendent of distribution, southern district, Puget Sound Power & Light Company; and R. J. Cobban, Westinghouse Electric & Manufacturing Company.

In the A.I.E.E. section the following are the new officers and members of the executive committee: chairman—Lindsay W. Ross, transmission engineer, Pacific Telephone & Telegraph Company; secretary and treasurer—J. C. Henkle, foreman of inside construction, Portland Electric Power Company; executive committee—L. M. Moyer, engineering department, General Electric Company, and L. W. Going, city electrical inspector, Portland.

Dinner Tendered Eureka Cleaner Sales Force at Spokane

A group of district managers and salesmen of the Eureka Vacuum Cleaner Company, together with representatives of The Washington Water Power Company, Spokane, local retailers of the Eureka company's products, recently was tendered a dinner at the Davenport Hotel in that city by A. J. McCarthy, vice-president and general manager of the sales of the Eureka Vacuum Cleaner Company, Detroit. R. B. Carter, in charge of sales for the Eureka company in Spokane territory, presided.

Mr. McCarthy addressed the gathering upon the operation of his company, touching briefly upon its growth in business, the growing market for cleaners, and the sales methods advocated by the company. In conclusion two motion pictures were presented, one showing the 1924 meeting of the Eureka branch managers in Detroit, and the other an advertising comedy, "Sign Féfé." Among the guests were J. E. E. Royer, assistant general manager, Lewis A. Lewis, sales manager, and R. B. McElroy, assistant sales manager, all of The Washington Water Power Company.

Electric Club Stages Successful Social Event.—The Electric Club of San Diego, Calif., recently paid a visit to the new Mission Beach amusement center. During the evening a dinner dance was held in the new casino and dance pavilion. There were more than fifty couples present to enjoy the dinner and the evening of dancing and cards.

Electrical Industry in San Francisco Hears Red Seal Plan Discussed

A meeting which was attended by 250 members of the electrical industry was held in the auditorium of the Pacific Gas and Electric Company, July 2, under the auspices of the California Electrical Bureau. R. E. Fisher, chairman of the advisory committee of the bureau, called the meeting to order and then introduced C. T. Hutchinson, chairman of the evening.

Fred M. Feiker, operating vice-president of the Society for Electrical Development, Inc., addressed the meeting on the Red Seal Plan. He first spoke of the problem facing the electrical industry as being that of the cost of distribution, which can be solved only by individual effort coupled with associated group effort. He stated that the Society for Electrical Development provides machinery to put into operation the programs outlined by the ten national associations in the industry. In speaking of the Red Seal Plan, Mr. Feiker said in part: "Competition in the wiring of new homes has for years been degenerating into a more or less general form of cutting down the job. The speculative builder has not been subjected to the pressure of demand by the buyer, the consequence of a general lack of understanding by the public of the importance of having a complete wiring installation. The responsible electrical contractor has been driven from the new residence wiring field, and the industry has had little or no control of the situation from the standpoint of adequacy."

Elements of the Red Seal Plan

"To combat this condition in a cooperative way there first came the electric home, which has demonstrated its ability to arouse public interest in the matter. The Red Seal Plan crystalizes the message of the electric home, and constitutes its most logical follow-up. The public is given a minimum standard, plus a means for identifying the home which is adequately wired."

"There are three main elements in the plan: 1. Establishing local minimum requirements as to adequacy, in terms of lighting, switch and convenience outlets, special and spare circuits, capacity of main service, etc. 2. Identification by means of the Red Seal emblem of the houses which at least satisfy the minimum requirements. 3. Popularizing the Red Seal emblem as the symbol of adequate wiring and creating a demand for Red Seal electric homes."

"In California the plan will be administered for the Society for Electrical Development by the California Electrical Bureau through the California Electragists."

Earl Whitthorne, commercial editor, Electrical World, gave a resume of the development of commercial activities in the electrical industry. He also outlined the progress which has been made in the electragist movement. The two major issues before the industry at present, as given by Mr. Whitehorne, are the development of local cooperation and of the contracting branch of the business. He stated that the electragist movement had been developed from the

former contractors' association and had been built up by the contractors.

A. M. Frost, commercial manager of the San Joaquin Light & Power Corporation, Fresno, discussed the sales problem of that company.

Central Station Sales Program

Hugh Crawford, general sales manager, Pacific Gas and Electric Company, outlined the \$5,000,000 sales program of that company and the Great Western Power Company. This program embodies a full measure of cooperation with the contractor-dealer and the merchandiser. Complete details of this plan were given on page 33 of the July 1 issue of the Journal of Electricity.

Clyde L. Chamblin, California Electrical Construction Company, San Francisco, gave some interesting information regarding the California Electragists. He stated that the membership of the organization included some 400, which is the largest enrollment in the Association of Electragists, International, in any state in the Union. In speaking of the employment of the California Electragists by the California Electrical Bureau to execute the Red Seal Plan, he said the electragists were determined to carry out the program successfully, but that it was essential that they receive the wholehearted support of every other branch of the industry in the work. Mr. Chamblin strongly urged that everyone give members of the Electragists' organization consideration and support when placing business.

P.C.E.A. Section Chairmen Are Appointed for 1925-26

Chairmen of the various sections of the P.C.E.A. for the coming year have been appointed by William Baurhyte, president of the organization. Section members will be appointed by the chairmen and will be announced in the Journal of Electricity as soon as possible.

The men appointed by President Baurhyte to fill the positions during the coming year are as follows:

Public Relations Section, A. B. West. The Southern Sierras Power Company. Public Policy Section, R. H. Ballard, Southern California Edison Company. Commercial Section, H. M. Crawford, Pacific Gas and Electric Company. Technical Section, R. R. Cowles, Pacific Gas and Electric Company. Accounting Section, B. B. Stith, Western States Gas & Electric Company. Purchasing and Stores Section, F. W. Smith, Great Western Power Company. Publicity Section, D. L. Scott, Los Angeles Gas and Electric Corporation. Insurance Committee, Herbert Dewes, The Southern Sierras Power Company. Transportation Committee, S. B. Shaw, Pacific Gas and Electric Company. Membership Committee, S. H. Taylor, Pacific Coast Electrical Association.

In appointing the section chairmen President Baurhyte, as far as was possible, named the vice-chairmen of last year's sections as chairmen for the coming year. Chairmen have been requested to appoint their fellow members as soon as possible, remembering that only members of the P.C.E.A. that are eligible to membership in the N.E.L.A. are eligible to committee appointment.

Personals

Clyde Chamblin, president, California Electrical Construction Company, San Francisco, was elected to the executive committee of the National Electric Light Association at its recent convention in San Francisco as a member at large to represent the electragists. He succeeds James R. Strong. As the rep-



CLYDE L. CHAMBLIN

representative of the electragists, Mr. Chamblin will voice the problems of that group to the leaders of the national organization with a view toward effecting the highest degree of cooperation and co-ordination between those two branches of the industry. Mr. Chamblin is particularly well fitted to act in that capacity because of his knowledge of the affairs of the electragist branch of the industry, his long experience, and his active participation in matters electrical. For the past three years he has been a member of the executive committee, Association of Electragists, International, and a director of the Society for Electrical Development, Inc., for the same length of time. He is a member of the advisory committee of the California Electrical Bureau and a member of the executive committee, San Francisco Association of Electrical Contractors and Dealers, of which he is past president. He is also a past president of the California State Association of Electrical Contractors and Dealers. In addition, he was formerly president of the San Francisco Electrical Development League and a member of the executive committee of the Pacific Coast Electrical Association. Mr. Chamblin is also prominent in the affairs of the Rotary Club of San Francisco.

J. F. Lincoln, vice-president of the Lincoln Electric Company, Cleveland, Ohio, recently left for a business trip to England. During his stay there he will visit the main industrial centers and make a study of export possibilities.

G. A. Hill has been appointed to take charge of the Wisconsin territory of the Curtis Lighting, Inc., Chicago, succeeding J. M. Weimer, who has been transferred to the Chicago office. Mr. Hill will be located at 506 Mayer Building, Milwaukee, Wis.

T. W. Nixon, formerly with the Westinghouse Lamp Company and at one time secretary of the Milwaukee electrical contractors, has been appointed secretary and field man of the Denver Electrical Contractors' Association, Inc.

H. G. Reid has moved his shop from 1643 Tremont Place to 1716 Broadway, Denver, Colo.

George Thompson, formerly of the appliance sales department of the San Francisco office of the Western Electric Company, recently was transferred to the sales department of the company's Oakland office. E. A. Crowson, who has been connected with the Oakland sales department, has been transferred to the San Francisco department.

H. L. Melvin, of the Engineering Department of the Electric Bond & Share Company, New York spent some time in Spokane recently enroute to Lewiston, Idaho, where he visited his former associates of The Washington Water Power Company of which he was formerly electrical engineer.

D. E. Harris, vice-president, Pacific States Electric Company, San Francisco, recently left on an extended Eastern tour.

J. B. Naugle, Naugle Pole & Tie Company, Chicago, recently visited the west coast in the interests of his firm, during which time he established a west coast sales office at Spokane, which is one of the producing centers of his company.

G. M. Wills, general superintendent, and Verne Johnson, superintendent of the San Bernardino steam plant of The Southern Sierras Power Company, Riverside, Calif., recently were visitors to San Diego, conferring with members of the San Diego utility company.

E. E. Scofield, assistant industrial engineer, The Washington Water Power Company, Spokane, visited Nelson, B. C., recently and inspected the hydroelectric plants of the West Kootenay Power & Light Company and of the city of Nelson, located on the Kootenay River.

E. S. Mathews, sales manager of the Electro-Kold Corporation, Spokane, spent a few days in Portland recently for the purpose of establishing a representative in that city to promote the sale of the electric home refrigerator manufactured by his company. From Portland his itinerary took him to California cities where new representatives recently have been established.

G. A. Hughes, vice-president and sales manager, Edison Electric Appliance Company, Inc., Chicago, visited Spokane lately, while enroute from the East to San Francisco. He was met in Spokane by Ray W. Turnbull, assistant Pacific Coast sales manager of Portland, who accompanied Mr. Hughes to San Francisco.

A. H. Crowell, formerly with the Washington Electric Supply Company, Spokane, has opened an electric shop at Roseburg, Ore.

R. M. Alvord and Morris Hixon, both of the General Electric Company's San Francisco office, shortly departed on a trip to the company's headquarters at Schenectady, N. Y.

C. D. Walcott, noted scientist with the Smithsonian Institution, Washington, D. C., was a recent visitor in San Francisco en route to Canada.

Robert Vogler, local agent, The Washington Water Power Company, Omak, Wash., attended the recent Moose convention in Spokane.

J. P. Surratt recently has become associated with the Salt River Valley Water Users Association, with headquarters in Phoenix, Ariz.

A. E. Rowe, of Garnett Young & Company, San Francisco, has been appointed a member of the newly organized Better Bushiness Bureau of the San Francisco Advertising Club.

Prof. Elihu Thomson, one of the founders of the General Electric Company and director of the company's research laboratory at Lynn, Mass., recently was awarded the Franklin Medal and a certificate of honorary membership in the Franklin Institute at Philadelphia. The medal was awarded "in recognition of his pioneer work in the fields of electricity and electrical engineering and of his numerous inventions in the fields." Professor Thomson has been granted more than six hundred patents, and his inventions in electric machinery, electric welding, watt-hour meters, lightning arresters and magnetic arc extinguishers are fundamental. He was the first to use oil as an insulating material in transformers, and the first to make the high-tension alternating-current system safe by introducing the practice of grounding the secondaries of transformers and distributing circuits. He made the first very high frequency dynamo in 1890; he also made the first high-frequency transformer and developed apparatus which afterward was utilized in wireless telephone and telegraph work. He was the first to make stereoscopic X-Ray pictures. Born in England, Professor Thomson came to America with his parents at the age of 5 years. After a period of teaching in the Central High School of Philadelphia, he became the technical head of the American Electric Company, New Britain, Conn., established on the foundation of his inventions. This company later was reorgan-



PROF. ELIHU THOMSON

ized on a larger scale, moved to Lynn, Mass., and renamed the Thomson-Houston Electric Company, which in 1892 was merged with the Edison General Electric Company into the present General Electric Company. Professor Thomson is a past president of the American Institute of Electrical Engineers and of the Massachusetts Institute of Technology. He is a member of various American and British scientific and professional societies, and the recipient of numerous honors, among them the Rumford, Edison, Elliott Cresson, John Fritz, Hughes and Kelvin Medals.

J. M. Laffin, for the past three years chief clerk at Walla Walla, Wash., for the Pacific Power & Light Company, Portland, was promoted on May 1, 1925, to be field auditor with headquarters at Walla Walla. Mr. Laffin was born in Ohio in 1876, and after graduating from business college at Zanesville, Ohio, at the age of twenty, entered the public-utility field with the Peoples Gas Light & Coke Company, Chicago. He remained there as bookkeeper and storekeeper until 1902, except for eight months with the Laclede Gas Company, St. Louis, and in that year went to Seattle and entered the employ of the Seattle Gas & Electric Company. In



J. M. LAFLIN

1904, after a second short period with the Laclede Gas Company, St. Louis, he returned to the West, taking a position with the Portland Gas & Coke Company. The years 1905 to 1908 found him employed in turn by the Lowman & Hanford Company, Seattle, wholesale and retail stationers in that city, and by the Seattle Lighting Company. He spent two years with the Spokane Falls Gas Light Company, Spokane, returning to the Lowman & Hanford Company, Seattle, again in 1910. In 1913 he bought the Northwestern Credit Association, which he sold in 1917, and after a few months with the Bisbee Improvement Company, Bisbee, Ariz., he returned to the Northwest and entered the employ of the Pacific Power & Light Company. In November, 1918, he was sent as chief clerk to Astoria, Ore., remaining there until his transfer to Walla Walla in 1922.

W. F. Price, formerly secretary of the California State Association of Electrical Contractors and Dealers and prior to that, field man of the California Electrical Bureau, has become associated with the San Francisco office of the Arrow Electric Company.

Oscar Agazelow, for the past five years representative of the stock sales department of the Great Western Power Company, San Francisco, has been appointed honorary consul for Oregon and Washington, representing the republic of Nicaragua, Central America.

James D. Sparks, formerly of Landers, Frary & Clark, New Britain, Conn., has been appointed Northwestern sales representative of the Majestic Electric Appliance Company, Inc., with headquarters at Seattle.

Garnett Young, president, Garnett Young & Company, San Francisco, shortly returned from an extended Eastern trip.

E. C. Hutchinson, vice-president and general manager, Pelton Water Wheel Company, San Francisco, recently sailed for Alaska to be gone about a month.

W. R. Lyall, formerly with the D. & W. Fuse Division of the General Electric Company, Bridgeport, Conn., recently has become affiliated with the Majestic Electric Appliance Company, Inc., as salesman in the San Francisco territory.

D. H. Braymer, formerly editorial director of Industrial Engineer, with headquarters in Chicago, has resigned to devote the major part of his time to the activities of the recently organized D. H. Braymer Equipment Company, which will specialize in consulting and sales work associated with power applications in industrial plants, large buildings and power plants. The new concern will have headquarters in Omaha, Neb., and Marvin Phillips will be associated with Mr. Braymer as installation engineer. Mr. Braymer will retain his connection with the McGraw-Hill Company as consulting editor of Industrial Engineer.

A. L. McCarthy, vice-president and general manager of sales, Eureka Vacuum Cleaner Company, Detroit, was the honor guest at a banquet given recently at the Olympic Hotel, Seattle, by the Poole Electric Company. About fifty dealers of western Washington attended the affair.

J. A. Tobyn, operating engineer, The Washington Water Power Company, Spokane, spent a week in Seattle and vicinity recently in connection with matters relating to interchange of power between his company and the Puget Sound Power & Light Company. Mr. Tobyn is in charge of the operation of the seven hydroelectric plants of The Washington Water Power Company under the direction of B. M. Merrill, superintendent of light and power.

J. E. E. Royer, assistant general manager, W. H. Ude, director of public relations and R. B. Childs, commercial department, The Washington Water Power Company, Spokane, recently accompanied a delegation of Elks to Wallace, Idaho, where the new home of the Wallace Elks was formally dedicated.

J. R. Kearney, sales manager, W. N. Mathews Corporation, St. Louis, Mo., recently visited the Pacific Coast in the interests of his concern.

H. E. Sanderson, Bryant Electric Company, San Francisco, recently returned from an extended trip through the East where he visited the factory at Bridgeport, Conn.

O. C. Merrill, executive secretary of the Federal Power Commission, Washington, D. C., has received the honorary degree of Doctor of Science from Bates College.

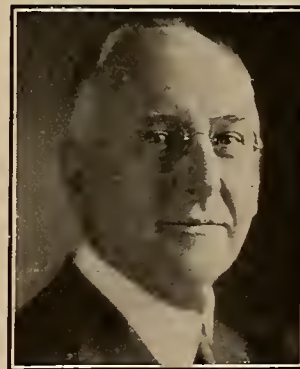
V. G. Shinkle, L. A. Lewis, T. G. Aston, J. B. Fisk, A. C. Haggemiller, A. H. Beckwith, L. E. Morse, E. Logan, R. B. McElroy, W. T. Ryan, B. H. Bishop, Gilbert Foster, James Fisk and Richard McKay, were among the golf enthusiasts of The Washington Water Power Company, Spokane, who attended the annual golf tournament held at Hayden Lake, Idaho. Mr. Shinkle won the first prize with a net score of 77.

F. E. Boyd, assistant sales manager, General Electric Company, San Francisco, recently returned from an extended trip throughout the East, visiting the company's factories at Schenectady, N. Y., Lynn, Mass., New York City and Fort Wayne, Ind.

C. A. Stirling, general manager of the Robbins & Myers Company of Canada, recently has been made manager of the New York sales office of that company. K. C. Berney succeeds Mr. Stirling.

Obituary

Tracy E. Bibbins, president of the Pacific States Electric Company and one of the pioneers in the electrical industry on the Pacific Coast, died at his home in Berkeley, Calif., July 3, 1925. Mr. Bibbins was born in San Francisco in 1866. He first became connected with the electrical industry in 1889 when he was employed in the construction of the first electric railway in Oregon, the Portland Albina Street road. Later he was transferred to the position of storkeeper of the construction company engaged in building the road. Shortly thereafter he entered the employ of the Edison Electric Manufacturing Company, which was then in the process of transmutation and shortly became the Edison General Electric Company and finally the General Electric Company. In 1898 he was attached to the San Francisco office of the company as clerk and rose through the positions of supply manager to local manager in 1912. The Pacific States Electric Company was formed in 1909 through the consolidation of three jobbing concerns, although Mr. Bibbins did not join it until 1916 when he became its president, a position he held until his death. Through his familiarity with merchandising problems Mr. Bibbins has been active in jobbing activities on



TRACY E. BIBBINS

the Pacific Coast for many years. He was one of the leaders in the formation of the California Electrical Cooperative Campaign. He was prominent in the affairs of the jobbers organizations and was president of the Pacific Division of the National Electrical Supply Jobbers' Association in 1919. Later he served on the executive board of this organization. He has been prominent in all phases of cooperative electrical development in California. His sudden death marks the passing of another of the early pioneers who gave California the name of a leader in things electrical.

TRADE NOTES

The Okonite-Callender Cable Company, Inc., is the name of the new company recently formed to offer to the electrical industry in the United States impregnated paper cables made by the secret processes and under the patents of Callender's Cable & Construction Company, Ltd., of London, England. The new plant is located at Paterson, N. J., and was ready for production July 1. The company claims it will be complete in every detail, combining the latest and best practices of this country and Europe, together with specially designed Callender machinery. It also will contain a completely equipped electrical research laboratory, which will work in conjunction with Callender's research laboratory.

Circle F Manufacturing Company, Trenton, N. J., has issued a new booklet containing prices and descriptions of its Circle F shallow type switches.

Moore-Bird Company, Denver, Colo., has been designated as an authorized distributor of the Magnavox line of radio receiving sets and loud speakers.

Jefferson Electric Manufacturing Company, Chicago, has announced a new apparatus for rejuvenating radio tubes which are exhausted or paralyzed, that is claimed to be inexpensive and efficient.

The Sundh Electric Company, Newark, N. J., has added another addition to its plant to be used entirely for office purposes. This is the fourth addition since the company moved from New York to Newark in 1918.

National Lamp Works of General Electric Company, Cleveland, has announced changes in names and addresses of the various divisions as follows: Federal Miniature Lamp Division, 342 Madison Avenue, New York, to Federal Lamp Division, 441 Lexington Avenue; Shelby Lamp Division, Buffalo, N. Y., to Empire Lamp Division; Bryan Marsh Division, 623 South Wabash Avenue, Chicago, to Midland Lamp Division; Bryan Marsh Division, 642 Beaubien Street, Detroit, Mich., to Michigan Lamp Division; removal of offices of Bryan Marsh Division from Grand Central Terminal Building, New York, to 250 Park Avenue, that city.

Pittsburgh Reflector Company, Pittsburgh, Pa., recently has issued a new booklet which fully illustrates and describes its system of indirect lighting, and pictures its different types of reflectors.

Electric Heating & Manufacturing Company, Seattle, is constructing a new factory building at the corner of Sixth Avenue and Harrison Street, which will be ready for occupancy on July 1.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., describes various types of autovalve lighting arresters in its Circular 1695-A. The publication covers the general characteristics of surge voltages and the conditions from which they arise. Illustrations and charts of interest to engineers are contained in the circular.

Crouse-Hinds Company, Syracuse, N. Y., has issued a new folder fully illustrated and descriptive of its Arkite circuit-breaking plugs and receptacles.

Chicago Fuse Manufacturing Company, Chicago, has announced the opening of a new sales office at 2131 Railway Exchange Building, St. Louis, in charge of E. M. Miller.

A. G. Manufacturing Company, Seattle, manufacturers of switchboxes and electrical appliances, has awarded a general contract for the erection of a new factory building at a cost of \$60,000.

Keystone Grinder & Manufacturing Company, Pittsburgh, Pa., recently has brought out a new portable electric twist-drill grinder. The device is powered by a ¼-hp. Westinghouse a.c. motor fitted with cord and plug, and has many other features.

The Maytag Shop has opened new quarters at 1619 Third Avenue, Seattle, replacing the old shop at 1504 First Avenue. G. W. Oberg, general manager of the Washington division, is in charge with a sales staff of fifty-eight men.

The Electric Controller & Manufacturing Company, Cleveland, has issued recently Bulletin 1048, describing a new push-button-operated oil switch for starting squirrel-cage motors and also single-phase motors. It is claimed this starting switch throws the motor across the line when the "start" button is pressed, providing no-voltage, overload and phase-failure protection.

Ray D. Lillibridge, Inc., advertising agency of New York City, which handles a large number of electrical accounts, recently has changed its address to 8 West 40th Street in that city.

Horton Manufacturing Company, Fort Wayne, Ind., has placed a new electric washer on the market, the No. 34, which it claims is distinctively different. The company is issuing descriptive literature of this new model.

The Trumbull Electric Manufacturing Company, Plainville, Conn., recently has developed a new tumbler switch in a special galvanized finish box for use with fractional horsepower motors.

The Savage Arms Corporation, Utica, N. Y., has announced the "Spin-Rinse, Spin-Dry" as an exclusive feature of its Savage washer and dryer, which it is claimed enables the user to rinse and dry an entire tubful of clothes within a few minutes and without handling the wash.

The Service Electric Store, Port Angeles, Wash., was damaged by fire recently, the damage being confined chiefly to stocks and fixtures. The building will be remodeled immediately and service resumed.

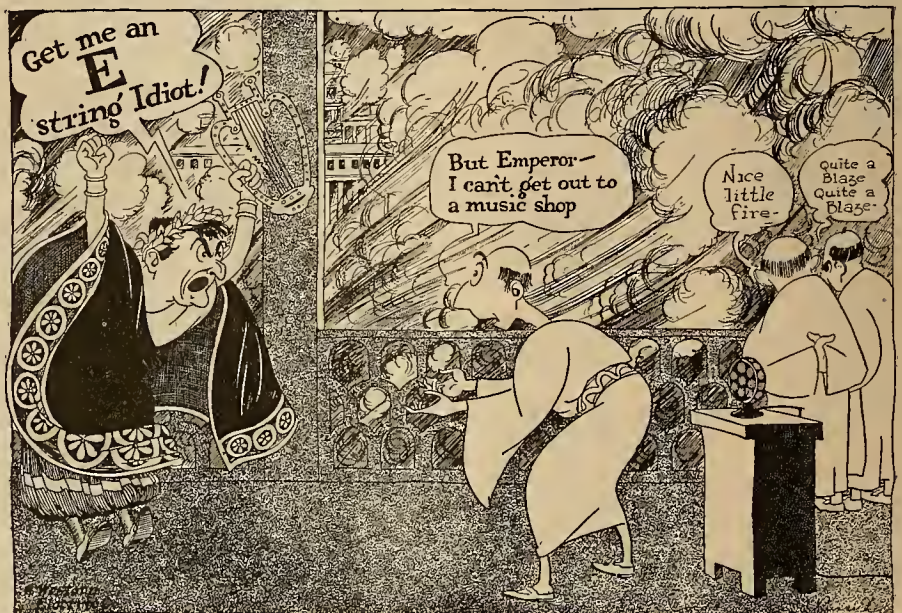
The Condit Electrical Manufacturing Company, Boston, has purchased a 15-acre tract with two high-grade brick buildings covering about 200,000 sq. ft. of floor space at Hyde Park, Mass., and now is completing a new brick structure on part of the property.

The Robbins & Myers Company, Springfield, Ohio, recently has issued a new circular, form No. 1257, illustrating and describing its new type "RF" fractional horsepower repulsion-induction motors.

Apex-Rotarex Stores has announced the opening of a new branch at 113 North University Avenue, Provo, Utah, under the management of P. J. Earl. It will handle a complete line of electrical appliances.

The Electric Home Company, 577 Seventeenth Street, Oakland, Calif., carrying a line of electric specialties for the home, has been appointed the representative of the Electro-Kold Corporation, Spokane, to handle the sale in Oakland of the electric home refrigerator made by that company. J. B. Sperry is manager of the Oakland company.

C. F. Braun & Company, manufacturers and engineers, Alhambra, Calif., and Tulsa, Okla., recently have issued Bulletin 117. The bulletin is profusely illustrated with photographs and diagrams and contains a full description of the Braun absorption plants.



WHEN ROME BURNED

Electrified history as seen by the Western Electric Company, showing "why Nero failed to go on the air, thus losing one of history's best opportunities for broadcasting"

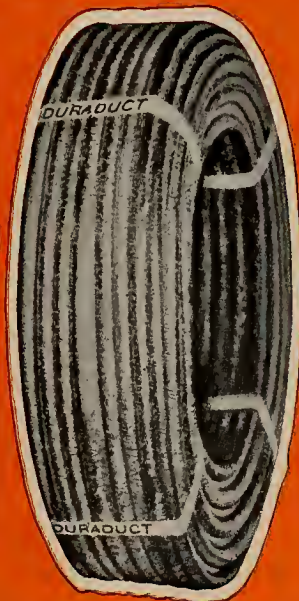
Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

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IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

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G. R. HENNINGER, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

R. N. PHELAN, Associate Editor
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VOLUME 55

SAN FRANCISCO, AUGUST 1, 1925

NUMBER 3

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McGraw-Hill Company of California — 883 Mission St. — SAN FRANCISCO

Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

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By McGraw-Hill Company of California

Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

McGraw-Hill Co., Inc., New York
Publishers of

American Machinist—European Edition
(Published in London)

Industrial Engineer (Published in Chicago)

Electrical Merchandising

Chemical and Metallurgical Engineering

American Machinist Ingenieria Internacional

Electrical World Electric Railway Journal

Engineering and Mining Journal-Fresno

Bus Transportation Engineering News-Record

Coal Age Radio Retailing Power

WITH its background of fifty years of close association with industry, the McGraw-Hill Company is presenting the principles of efficient selling through a series of advertisements which are being run in some of the country's principal newspapers. The attention of our readers is called to the fourth advertisement of this series which is reproduced on pages 32-33 of the advertising section of this issue.

To manufacturers and salesmen who are selling industry the chief value of the story told in this advertisement is that it gives expressions in black and white to facts which they have known for a long time. Obviously, knowledge of a customer's business and of the service of product which is being offered for sale in his plant is becoming more and more needed for effective sales work. However, the point which we wish to emphasize in this advertisement is the concise statement of the four principles of industrial marketing. These are:

1. Market Determination

Markets should be analyzed, worth while prospects located and effort concentrated upon them.

2. Buying Habits

The buying habits of industry are definitely known. Sales and advertising plans should take these buying habits into account.

3. Channels of Approach

There are direct means of reaching the industrial buyer which can be used effectively and economically.

4. Appeals that Influence

The industrial buyer is influenced by certain known appeals. He should be approached through these appeals.

In an effort to lower distribution costs the McGraw-Hill Company has made an extensive study of the buying habits of industry. The results of this study have been published in a booklet, "Industrial Marketing," a copy of which will be sent upon request to anyone whose markets embrace the industries covered by the McGraw-Hill publications.

Nearly Six Billions Appraised (\$6,000,000,000)

The value of public utility,
manufacturing and other
properties appraised by
Stone & Webster is nearly
six billions (\$6,000,000,000)

STONE & WEBSTER

INCORPORATED



EDITORIAL

Standardization Keynote of Lamp Simplification Program

STANDARDIZATION as advocated by Secretary Hoover and the Department of Commerce has been adopted by the lamp manufacturers. In the Mazda lamp simplification program just announced a new lamp with but one finish will replace all of the various sizes, styles and finishes of bulbs used for general lighting (10-100 watts inclusive). In connection with this program of simplification and standardization it might be well to review the progress which has been made by the industry in the past few years. In 1909 three tungsten filament lamps were listed for general lighting. Today there are 22. On the majority of these there are demands for fifteen different finishes. In addition these various types with their different finishes must be manufactured for different voltages. Last year alone manufacturers received requests for 3,000 different types of lamps.

It is to relieve this complex manufacturing and merchandising problem that the simplification program has been announced. The important features of the new program are: all bulbs will be uniform in shape and finish; all bulbs will have an inside frosting; the outside surface will be smooth; no distinction will be made between gas-filled and vacuum lamps; the new lamp will be more efficient.

The actual economic value of the program will be enjoyed by the manufacturer, merchandiser and the consumer. From the standpoint of the manufacturer costs will be reduced as soon as the program becomes operative. Stocks will be reduced as there will be no necessity to carry different types and finishes. Service and quality will be improved. From the standpoint of the distributor and merchandise stocks will be reduced and there will be a more rapid turnover. A better service will be available to the consumer because stock will be better balanced. Time will be conserved in handling sales as the purchaser will not be required to choose from a number of styles and finishes. Profits will be greater due to all of the foregoing factors. The consumer will have less confusion in purchasing lamps. He will get a more efficient product and therefore will receive a greater value for money expended during operation. The new lamps will cost less.

On the whole it is apparent that the industry as a whole and the public at large will benefit greatly through the successful execution of the lamp simplification program.

Lake Britton—a Memorial to a Great Leader

PECULIARLY fitting were those portions of the dedicatory exercises of the Pit No. 3 plant of the Pacific Gas and Electric Company that were devoted to the revered memory of a man the very mention of whose name arouses in the heart of every California electrical man a picture of love, friendship and leadership. And so that the name of John A. Britton will forever be remembered, officers of the Pacific Gas and Electric Company have placed his name upon one of the important units of the Pit River development. The storage reservoir above Pit No. 3 plant, a beautiful lake stretching nine miles upstream from the masonry dam, has been named Lake Britton. It is fitting that the name of the man who played such an important role in the early development of the electrical industry, whose leadership has inspired and guided so many others, should be given to an active and important part of the great hydroelectric system which he worked so hard to build.

Popularizing the Red Seal Idea

CALIFORNIA has the honor of displaying the first electric home west of the Mississippi to be constructed under the Red Seal specifications. To this home and its owner will go the first Red Seal certificate to be issued in this section of the country. Now that the Red Seal plan has been adopted, it is time for the industry to consider plans for reaping the greatest good from its application.

The specifications as they have been adapted to fit California conditions are interesting. The Red Seal requirements given on another page of this issue are a reasonable minimum standard and are based upon knowledge and study of present-day electrical service and appliances which should be available in the average home. There will be those in the industry who will argue that the requirements are not sufficiently high and also those who will believe that the specifications are too rigid. But a careful study will show that adequate lighting, a sufficient number of convenience outlets for the proper use of appliances, and provisions for the installation of an electric range are the only requisites for a Red Seal certificate.

However, the specifications themselves are meaningless unless they are supported by the industry and sufficiently popularized so that the public will

realize that a Red Seal home is the acme so far as the proper utilization of electricity is concerned. The industry is familiar with what the most complete application of this program will mean from a dollars and cents standpoint. The problem which remains is to acquaint the public fully with the meaning of a Red Seal home. In this connection it might be well for the power companies, the manufacturers and contractor-dealers who will receive the benefits to utilize some portion of their advertising appropriations for this purpose. If it is not possible to wage a cooperative advertising campaign, it is at least possible for the various individual companies to tell the public that a Red Seal home is an electric home.

Ethical Treatment of

Santa Barbara Contractors

DESPITE the losses incurred by electrical contractor-dealers of Santa Barbara as a result of the recent earthquake, it is gratifying to note the spirit of optimism which this branch of the industry is displaying in getting back on its feet. On other pages of this issue are photographs of some of the shops, and a letter from the executive secretary of the Electragists who visited the city shortly after the disaster. One enterprising dealer, his establishment partially wrecked, has set up his business on the sidewalk. Across the front of his store is this sign: "Let's forget it and EAT. Cook with electricity."

In his letter regarding conditions in the city Mr. Geisbush sounds a warning which the industry will do well to heed. He cites the tendency of contractors of all classes to make Santa Barbara their headquarters in the hope of reaping some gain from the reconstruction activities. It will be regrettable if the electrical industry of the state permits unjust and unethical outside competition with the established contractors. The industry owes these men who have been an integral factor in the electrical growth of the city for many years the opportunity of recouping the losses they have incurred and of regaining the mental and financial balance which the earthquake destroyed.

DISCUSSION

Gifford Pinchot and "Giant Power"

To the Editor:

Sir—The symbolic term "giant power" which is being broadcast at this time by Gifford Pinchot is indeed a word to conjure with. It fires the imagination by its very vagueness and suggestion. Since the Pennsylvania governor has brought the phrase to us, it deserves analysis for the elucidation of all the people.

In discussing the "giant power" plan, Mr. Pinchot outlines his views on the matter, as follows: there

should be a central pool of all electric power from which all the people and industries would be served. This he says would decentralize industry, restore country life and build up small communities and the family. He further states that there is a need for state or national regulation of the electric light industry. And he makes the criticism that the small user of electricity is discriminated against because the unit of power costs him more than does the unit of power sold the large user.

Let us examine these statements for what they are worth, taking them in the order given above.

"Giant power" means the pooling of power from all sources, with distribution from a central point as opposed to the present plan of various companies serving their own territories from their own power stations, and interchanging small surpluses to meet the needs of the interconnected companies. Viewed from one angle, such a pool would result virtually in stripping the West of its greatest natural resource, water power, by taking all that power to a central pool. The West wants industries to come west and use its power. The "giant power" plan wants to take the power to the industries. Viewed from another angle, the "giant power" plan of a central power pool is contrary to sound economic practice. If a manufactured article is transported any distance the cost of the article to the consumer must be higher, on account of the cost of transportation. This is especially true in regard to electric power which, to transmit over distances, requires expensive copper wire, towers and poles, switches and meters and transformers and large crews of men. The people of this state enjoy a low rate because first, their electric energy is developed by water power and secondly the transmission distances are not excessive. But if the electric energy generated at our water power sites is transmitted to a central pool somewhere in the Middle West it will cost the people of the Middle West more. The Middle West can't get cheap power that way, the industries must come to the power sites.

It is a far cry for the imagination to perceive how the central power pool is going to decentralize industry and restore country life. The very statement indicates that the "giant power" advocates do not know whereof they speak; they are politicians meddling in a technical business. Giant power, through its central pool would only centralize industry the more. All industries would crowd about the pool in order to lessen the distance of transmission. Where would the farmer get off at under such a state of affairs? Clearly, unless he moved his farm close to the central pool he would have a difficult time getting any electric service at all, let alone at a reasonable price. Under the present arrangements, power stations are scattered about the country, serving small communities and farms. This is better than throwing all power into a central pool where only centralized industry would benefit.

When Mr. Pinchot states that there is need for state or federal regulation he implies that such regulation does not exist at this time, which is a statement directly opposed to the facts. Are the electric

light companies being regulated? Our Secretary of Commerce, Herbert Hoover says: "There is scarcely a single public utility today that is not under public control through some governmental commission, local or national. These commissions today fix the rates, the issues of stock, the time tables, the car service and the profits. Regulation has through stabilizing rates reduced the cost of capital by increasing the security for the savings of the people. From this security and within our generation there has come a new tide, and that is toward popular ownership as distinguished from government ownership."

In our own state the electric light companies are regulated by the Department of Public Works. Where is the basis for Pinchot's implication that there is no regulation?

The last statement of Mr. Pinchot to be considered and the most peculiar is that the smaller user of electricity is being discriminated against because his electricity costs him more per unit than does the electricity bought by the large user. Of course it costs him more, because to serve him the power company must install the same, and sometimes more, equipment than it does to serve the large user. The cost to the large user is spread over a large purchase of power. This is an economic axiom that you can sell goods in quantities cheaper than you can sell them at a piece. A carload of bread costs less per loaf than a purchase of two loaves. This is the basis of business, wholesale buying and quantity prices.

And so, under analysis, the "giant power" plan is seen as an ephemeral and visionary scheme. The proposed power pool would be uneconomic in practice and discriminatory to the states which would be stripped of their power for the benefit of others. And, rather than decentralizing industry, the power pool would only further centralize it. The regulation appealed for is already accomplished fact. And "giant power" no matter what its politician advocates claim for it, cannot sell small bits of power cheaper than it can sell large quantities.

"Giant power" only means furnishing cheaper power to a few central communities and industries by penalizing the other people and sections of the nation.

E. J. CROSBY,

Spokane, Wash.,
July 9, 1925.

Washington Water
Power Company

Santa Barbara Contracting Conditions Described by Electragists' Secretary

To the Editor:

Sir: I made a trip to Santa Barbara last week for the purpose of aiding in whatever way possible the contractor-dealers of the Santa Barbara district, and I found conditions pretty badly demoralized. You can appreciate that every business man in that community is more or less shaken, wondering what the future holds for him, especially in view of the fact that there seems to be a general move on the part of

embryo contractors over the entire state to make Santa Barbara their headquarters for the next several months.

The contractors of Santa Barbara have asked that people having a desire to start in business or extend their activities to that district first communicate with somebody familiar with conditions so that they may receive information of value to them. Anyone interested in that district can get first-hand information by appealing to any reputable contractor in Santa Barbara or to me at Los Angeles.

As matters stand now there are sufficient contractors established and operating in Santa Barbara proper to take care of any of the construction work which may be done, for, contrary to the opinion generally held throughout the state, the work will progress at a slow rate and business buildings will be built only as rapidly as the owners finance the work.

While in Santa Barbara I took several snapshots of the shops there and some snapshots of places where shops used to be. In using these, pay particular attention to the optimistic spirit exhibited by the owners of the California Electric Company as indicated by the sign hung over their front door—"Let's forget it and eat. Cook with electricity."

If you should care to use any of this information in the Journal of Electricity, please stress the need for ethical treatment of the Santa Barbara contractors by anyone called upon to bid on the work of reconstruction. This is a duty that we owe the boys, and certainly no one will profit much by further destroying the conditions of men who are already shaken mentally and financially.

C. J. Geisbush, Executive Secretary,
California Electragists, Southern Division.

Los Angeles, Calif.

[Editor's note: The pictures referred to in the above letter appear on page 108 of this issue.]

Manufacturer Comments on Article on Electric Air Heating

To the Editor:

Sir:—I have been very much interested in your article by Geo. W. Barker on page 361 of your May issue. It contains many arguments which the writer has emphasized for many years and with many power companies and we hope it will have its effect upon the short-sighted officers of many of the power companies who cannot or will not see or appreciate the trend of the times and the fact that the public will have and are willing to pay for electric heat, simply because it is better and cleaner and more desirable in every way.

The writer would like to have the privilege of reprinting parts of this article and if you will grant him this privilege, he will, of course, give credit to your publication and to the author.

P. F. APFEL, President,
Electric Heating & Manufacturing Co.,
Seattle, Wash.



NORTH Fork of Kings River on which the San Joaquin Light & Power Corporation is erecting Balch plant, the highest-head installation in America. Initial capacity is 28,250 kw.

Skagit River Development of the City of Seattle

By J. D. Ross

Superintendent, City Lighting Department, Seattle

THE Skagit River development of the Seattle municipal light and power system has received a great deal of publicity during the past six years, which is the construction period of the first unit of the development. This unit of 50,000-hp. capacity was officially placed in operation Sept. 27, 1924, and has been in continuous operation since that time.

The first unit of the development, known as the Gorge Plant, is a substan-

tial and reliable hydroelectric station by virtue of careful design, which takes full advantage of the many favorable conditions for power development found on the Skagit River. The Skagit River itself is the largest stream tributary to Puget Sound, rising in Beaver Lake, B. C., twenty miles north of the Canadian line and emptying into Puget Sound near Mt. Vernon, Wash., being 125 miles long, with a drainage basin of 3,100 sq. miles.

This basin receives an annual precipitation exceeded in few areas in the United States. The large proportion of the basin lying at high elevations makes a condition especially favorable for summer storage in snow fields and glaciers. The flow of the river at the point of diversion of power averages 4,650 sec.-ft., forming a 1,200-sq. mile drainage area. With the maximum run-off occurring during the dry summer season, May, June, July and August, and the minimum at times of low temperature, usually from the latter part of December to the first of March, the absolute minimum recorded on the river is 700 sec.-ft. and the minimum of 800 sec.-ft. has occurred only a few days during the years 1909 to 1923, during which records have been kept.

The portion of the Skagit River which is to be utilized for power by the Seattle municipal development lies between Mile 39 and Mile 51 measured from the mouth of the river, although the dam proposed at Ruby Creek will back the water up approximately to Mile 81, just over the Canadian boundary. The drop available for power is from El. 1,600 to El. 485, or 1,115 ft.

With the flow of water available, the potential power that can be developed is 225,000 kw. continuously, representing over 2,000,000,000 kw-hr. per annum. The installed capacity as planned at present

AMONG the notable new hydroelectric projects in the Pacific Northwest is the City of Seattle's Skagit River development, the first unit of which has been completed and in operation for almost a year. The Gorge plant, as it is called, has many notable features of interest to engineers. Included in these are the 11,000-ft. concrete lined tunnel and a noteworthy wood pole transmission line.

is 555,000 hp. which may be increased as required by the character of the load to be carried in future years, and to work in conjunction with steam and other hydroelectric developments on the same system.

The outstanding features of the finished development of this power site are:

1. The Ruby Dam, set in solid granite and 480 ft. high, impounding a reservoir, also in solid granite, of 1,300,000 acre-ft. which will conserve the entire

flow of the river to be used as needed for power.

2. The solid character of the rock through which the river flows for its entire course from the Ruby Dam to the lowest power house, which permits of pressure tunnels and guarantees a development of the most permanent and reliable nature.

3. Adaptability of the site to development in steps as the demand for power grows, so that investment charges during development may be made a minimum.

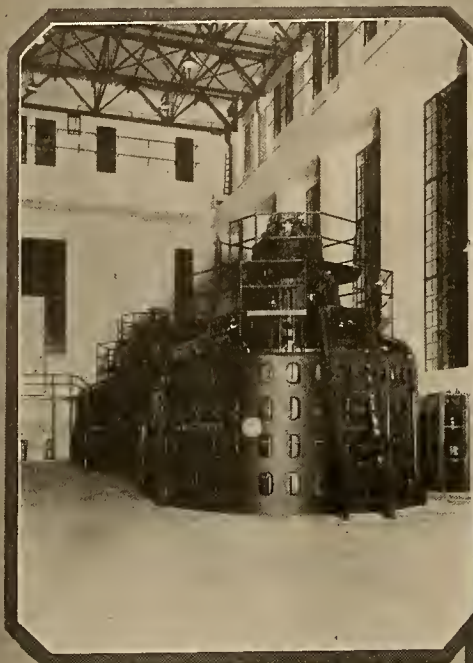
The first unit of the development consists of a power house located just above the mouth of Newhalem Creek, containing two 30,000-kva. Westinghouse generators, each driven by a S. Morgan Smith vertical hydraulic turbine of 38,800 hp. The power house, of reinforced concrete, is made large enough for three of these units, and the foundations, penstocks, and Johnson valves are in place for the three units.

Hydraulic Features of the Gorge Plant

These machines are designed for 375-ft. head and are operated at 270 ft. at the present time or until the proposed Gorge masonry dam is built to raise the head approximately 100 ft. They are fed with water through a tunnel 11,000 ft. long and 20-ft. 6-in. internal diameter lines throughout with 18-in. concrete.

This tunnel runs on an even grade from intake to power house and divides at the lower end into three 10-ft. openings which are lined with steel for the last 400 ft. and each is closed at the lower end by a Johnson valve. A surge chamber of the same diameter as the tunnel is driven vertically through the mountain at a point 1,100 ft. from the power house.

The upper end of the tunnel is provided with steel trash racks and lift gates operated by an electric



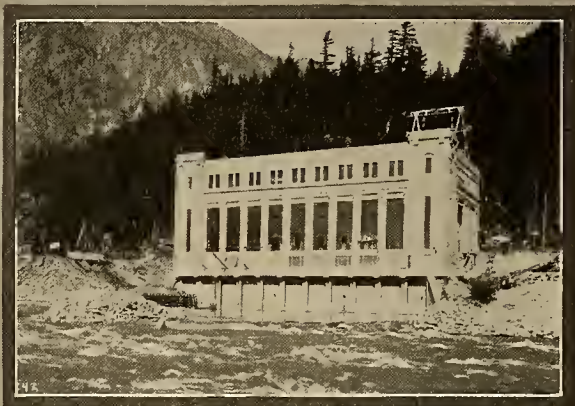
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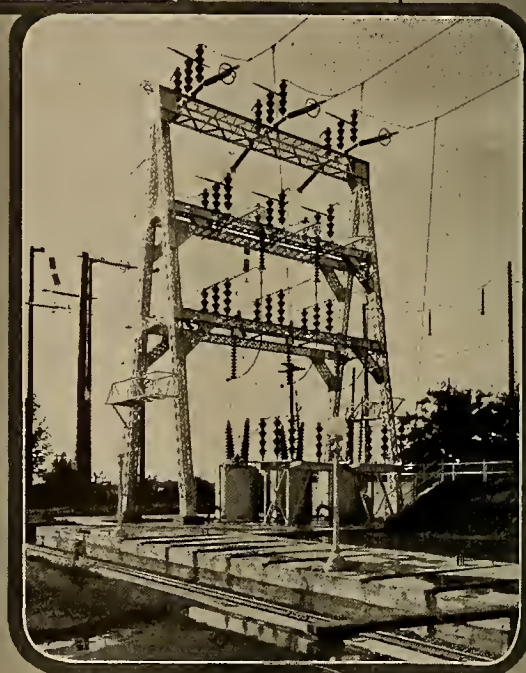
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6

INTERIOR of the Gorge Plant of the City of Seattle's Skagit River project showing the two 30,000-kva. units is depicted in No. 1. No. 2 presents a section of the 165-kv. transmission line to Seattle. Special steel crossing towers are shown in No. 3. A general view of the exterior of the plant, which will have an ultimate capacity of 225,000 kw., is given in No. 4. Oil switches and a portion of the bus at the receiving substation in Seattle appear in No. 5. The interior of the 11,000-ft. tunnel at the point where the penstocks enter is shown in No. 6.

hoist. Water is diverted into the tunnel by a rock-filled timber crib weir which raises the water approximately 10 ft. and is provided with flash-boards placed in sections 10 ft. long to raise the water 8 ft. higher. These flash-boards are held by steel rods on the upstream side which have a carefully calibrated turned section designed to break progressively across the river as the head over the flash-boards rises, so that in case of flood a sufficient number will be washed out to relieve the pressure and prevent damage.

Transmission System

From the power house the current is stepped up to 165 kv. for transmission to Seattle, 105 miles away. The transmission line right-of-way, secured by easements or deed, is 300 ft. wide to a point about 13 miles north of the city limits, and from there to the North Substation in Seattle 150 ft. This right-of-way provides for four lines to the above mentioned junction point, from which two lines will enter the city from the north and two will be carried around Lake Washington, entering from the south. A single line is in operation at present carried by 11-in. top cedar pole towers of H-frame design. The conductor is 477,000-circ. mil. aluminum cable, steel reinforced, held by Westinghouse No. 601 insulators, twelve in series in suspension and fourteen in series at dead ends, with special high strength insulators at the points of greatest strain.

The most noteworthy feature of the line is the thoroughness with which the guying has been done and the care and design of the cross-arms. The double arm, which is used on the standard towers, is trussed at the center and ends, to greatly increase its strength. Steel towers are used only at long spans for river crossings and at the terminals of the line. It was computed that the saving in fixed charges by using wood poles would permit rebuilding the line at the end of fifteen years and still show a saving at the end of thirty years over a steel tower line. During the first six months of operation this line has a perfect record and it is believed to be the sturdiest wood pole transmission line in the country at the present time.

The North Substation

At the step down station, which is located at the corner of 8th Ave. N. E. and East 75th Street in Seattle, transformers are placed to reduce the voltage to 26,000 volts, 3-phase, for city distribution. These transformers with high-tension switches, are placed outdoors, and the station building contains 26,000-volt bus and switching apparatus. It also contains one 15,000-kva. synchronous condenser used for voltage regulation on the transmission line, with foundations and building space for a second condenser of the same size with its auxiliary equipment.

The step-down transformers consist of three 10,000-kva. single phase units with a fourth, or spare transformer; a second bank of three is to be

installed very soon. The building, like the Gorge power house, is of reinforced concrete of the sturdiest and most permanent design.

The demand for power on the Seattle Municipal System is growing at such a rate that the 50,000-hp. unit of the Skagit development will be entirely loaded in 1927 or at the latest by 1928. The original plans for the Skagit development called for building a masonry dam at the Gorge to raise the head on



Artist's drawing of the complete Skagit River development of the City of Seattle. Gorge power house is in the foreground. The contemplated Ruby plant may be seen on the left bank of river farther upstream.

the present units to 375 ft. and provide storage for daily variations in load. On account of the immense storage possible at the Ruby Reservoir, which will conserve the entire river flow for power, it is now planned to build the Ruby Dam as the next step of the development.



A view of Denver's movie row showing the large number of electric signs.

Consistently Selling Better Lighting

By S. W. Bishop

Executive Manager, Electrical Cooperative League, Denver

VISITORS to Denver, especially electrical men, express themselves as definitely impressed with the various forms of commercial lighting observed in the downtown section. Block after block of attractive display windows and not just a few isolated installations seem to emphasize this impression. And then on the side streets and out in the residential section the surprise is not dissipated for there during the past year the electrical industry of Denver has obtained marked results with the neighborhood merchants and other industrial establishments.

To what is this betterment of illumination due? From a close-up and possibly prejudiced angle the answer is "Definite lighting sales policy." This does not apply to the Public Service Company of Colorado alone, although it can be said without question that its aggressive commercial policy has dictated unusual activity in this line. Credit must be given to a few lighting equipment manufacturing departments and those contractors having an appreciation of and also ability to sell improved lighting equipment.

DENVER is regarded as one of the best lighted cities in the United States. Higher foot-candle intensities are employed in store windows, more signs are used and better commercial lighting obtains generally in that city than in many larger ones. In this article the author describes the cooperative efforts which have been employed to sell better lighting and the important part in this work played by the Electrical Cooperative League.

Before the sales stage has been reached, however, there are other influences at work—education and example. And here is where all of the agencies listed above come in, plus the Electrical Cooperative League.

Since its organization in 1921, the advisory board of the League has emphasized the possibilities of better lighting and actively extended its field work in that direction. Even in 1923 the establishment of a commercial lighting exhibit was considered but a year later

this idea gave way to the one that a "Well Satisfied Customer Is the Best Advertisement."

The establishment of a number of representative installations in both windows and store interiors provided practical ocular demonstrations which automatically would attract the attention and obtain the interest of other merchants and business men. This is true of small establishments as well as large ones for the reason that the small merchant obtained ideas from the bigger ones and other smaller stores were quick to realize what competitors in their own class were doing.

In strictly commercial lines this has resulted in

foot-candle intensities exceeding one hundred in more than a score of stores. In the case of two large department and specialty stores, both having arcade windows, the result can be better visualized with the information that on all sides of the windows, reflectors have been installed on 12-in. centers; in one case the number, and a record one, is about 820 outlets and in the other, also a new building, about 330. This does not include spotlight outlets and convenience outlets.

The interiors of both of these establishments are equipped with one-piece, totally enclosed glass units using 300 and 500-watt lamps and even with a high mounting an average counter intensity of 18 foot-candles is obtained.

Adequate Wiring Is First Requisite

Good lighting cannot be secured without adequate wiring. Consequently in the case of new buildings or stores as much assistance as possible is given in advance to the owners, builders, and architects. In both of the comprehensive installations mentioned, this chain of contact was followed and continued until the journeyman mounted the reflector and inserted the lamp.

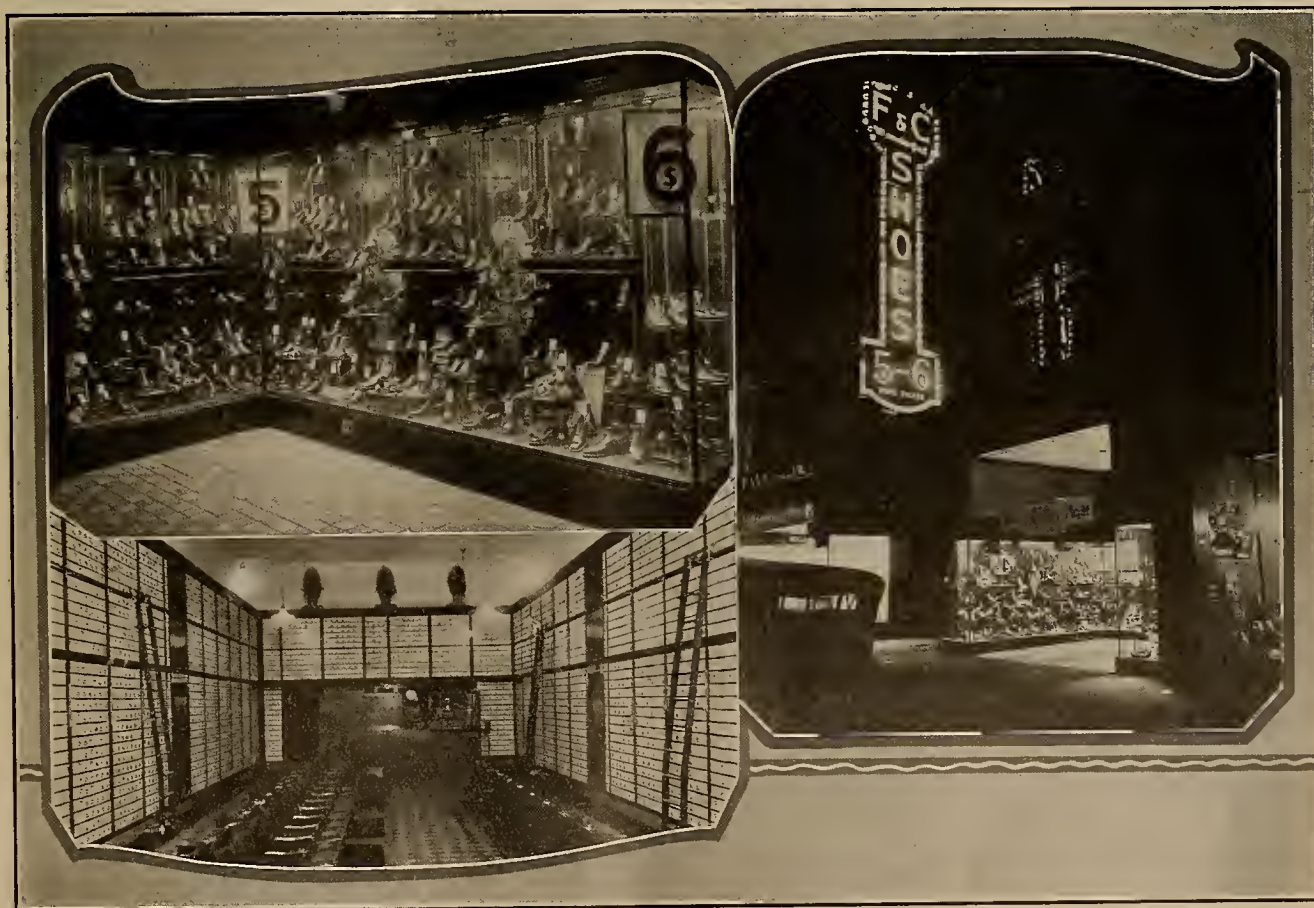
Similar examples on a smaller scale could be cited in outlying stores and in the suburban areas of Denver. An extremely interesting case is that of a small incorporated city adjoining Denver where until a year ago there never had been a mirrored glass reflector installed in any store.

Selling with a Working Sample

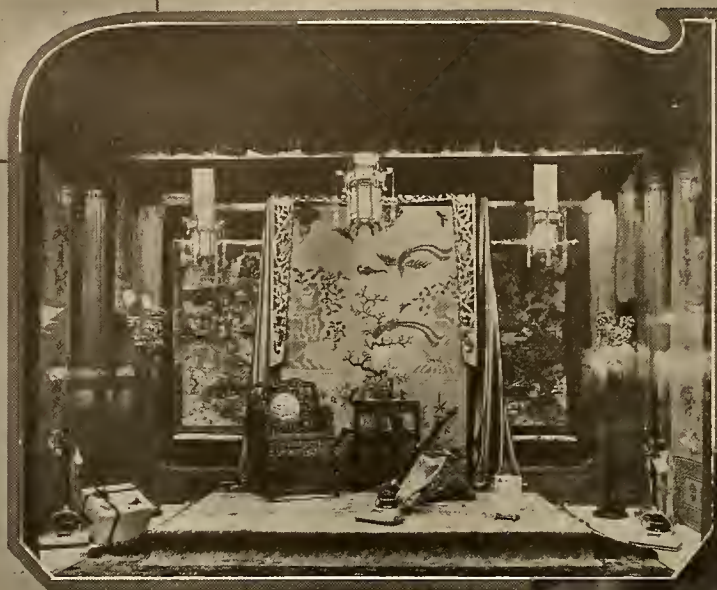
Then thanks to the aggressiveness of the suburban central station, a model window was installed in its own local office and before the campaign was finished ten stores had changed their lighting. The results were sufficiently satisfactory that this same central station then established a flat rate schedule for commercial lighting and went so far as to install a separate circuit and time clock in its office to control the other windows. Before that time, with the exception of Saturday nights and short winter days, window lighting of any extent was not employed by the merchants of that town.

The same standards have not been recommended as a matter of logic to all classes of stores. Proper consideration and due regard has been given to the type of business, its location, activity of competitors, economic investment and any special requirements. When this system is followed it has been found that more satisfaction obtains on the part of the person paying for the installation and each customer regards his lighting in a more personal way, certainly not in the stereotyped fashion of a few years ago when bare lamps and tin shades were the vogue.

Although Denver was one of the first cities in the United States to install ornamental lighting standards in the downtown section, the only change on the three main thoroughfares has been the replacement of arc lights by incandescent lamps mounted in ball globes. On several of the cross streets and main arteries leading from the business section, more

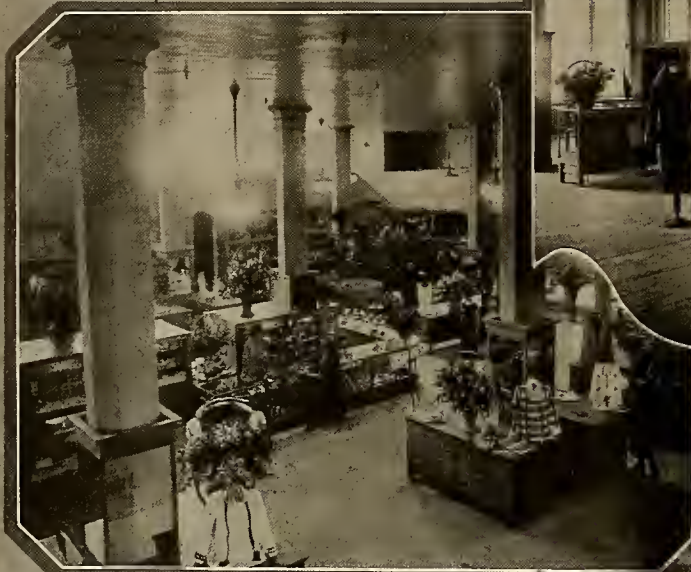


Exterior and interior views of the Denver store of the Feltman & Curme Shoe Company that was equipped during the lighting campaign. The show windows have 200-watt lamps and mirror glass reflectors on 12-in. centers.



1

EXAMPLES of commercial lighting recently installed in Denver. By an intensive cooperative sales drive these representative results were secured. Excellent window lighting is obtained by Daniels & Fisher (1). High intensity interior illumination is employed by The Neusteter Company (2, 3, and 4), and filters are used to eliminate glare in arcade windows (5).



3



2



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4

modern street lighting equipment has been installed by the property owners and merchants on those streets.

Better Street Lighting and Its Effect

This idea has led to the installation of ornamental standards, both cast iron and pressed steel, with proper diffusing glassware, in front of many new store buildings and apartment houses in the residential sections of the city. Garages too have been thus equipped with exterior lighting.

Because of the individual cases, there has been no standardization but every effort has been exerted to insure similar types of equipment which can be retained as part of the main system if those streets are eventually equipped throughout with ornamental street standards instead of the corner arc or enclosed lamp.

The part that this street lighting has played in store lighting has been considerable owing to the problem of comparative intensities. It is a recognized fact that store windows must necessarily be of a higher wattage when the intensities on the sidewalk are greater. This one fact alone was the determining factor in the installation of a large store window downtown although it may be several years before the street intensities will be increased to the point recognized by the present window lighting.

Sometimes there is a backfire in this lighting educational work as demonstrated by a recent installation in a large office on the ground level of a prominent cross street. The recommendations made by the field representative of the league were respected in every detail excepting the method of mounting the reflectors in the window. The office manager it seems had an idea that sidewalk lighting would attract more attention than proper intensity on the displays which were of an institutional nature.

No amount of reasoning would get him to have the diffusing type of reflector reversed. His opinion was quite marked that the long lip of the reflector should point outwards. The valance which was ordered before the installation of the lighting has since been installed. It is of proper depth and conceals the reflectors from view. The valance has cut the light distribution from the sidewalk but the manager is still obdurate in his belief that he has evolved a novel usage for that type of window lighting reflector.

Central Station Activities

Commercial lighting provides one of the chief sources of revenue for the Public Service Company of Colorado. In order to facilitate the sale of energy and to give proper development to the commercial, and incidentally the industrial lighting field, a separate division is maintained in the commercial or new business department to handle this business.

There is a staff of six men under the director of the department and each is assigned to various sections of the city. A designer skilled in sign work also is attached to the department. Through this group all new business is ascertained and a close check maintained on the lighting requirements of all installations in the respective areas of each representative.

These men can be classified more as lighting sales engineers than illumination engineers because their chief responsibility is the sale of adequate lighting equipment rather than the design of lighting installations. However, their work brings up problems of this nature daily and whenever assistance is requested the staff gladly works out designs and takes a chance on a later sale in competition with other firms.

Each representative is held responsible for the commercial lighting sales in his territory. Although the company handles lighting fixtures for homes, this activity is in the hands of other commercial department representatives. Electric signs of course are negotiated by the commercial lighting department. In addition to the designing of the signs the company also maintains a shop for their manufacture and fabrication.

The Public Service company regards commercial lighting activity just as separate and important as power sales. Consequently a definite quota of business is assigned to the department and each representative. Thus far this year, the sales are reported as being in excess of the figure established from the business of previous years.

Where missionary work is being done there is bound to be a number of conversions. Occasional calls of lighting specialists cannot help but break down barriers and dissipate ignorance. New ideas are disseminated. Many calls may be made before a sale results but in the aggregate there is a marked cumulative benefit as reflected by the total value of sales of the Public Service Company of Colorado during the course of a year.

Activity is not confined to new work. The representatives keep track of all new jobs but the real field for development has been found in so-called old work. Relighting a store interior, additional reflectors for the window, a new or larger electric sign and the negotiation of advantageous rates for various classes of commercial lighting service are part of the duties of each representative.

From the central station standpoint, the advantages of such activity are obvious. The most important accomplishment is the "insurance" given the lighting load of the company. The right kind of equipment and of equal importance, the right kind—and size of lamps are provided. Wattage is not sacrificed for "something just as good."

Other Branches of Industry Busy Also

The other divisions of the electrical industry appreciate in the main what the Denver central station is doing for the commercial lighting business. Several of the jobbing houses are placing men on this line of work exclusively. Their services might also be called missionary work but with a direct sales result because the business which they develop is usually turned over to an established contractor.

In the last few months at least a dozen splendid sales have been developed exclusively from the jobbers' efforts, not to mention many incidental sales of equipment.

Contractors, where not specializing in some particular commercial unit, are found to be handling

the proper type of glassware. Totally enclosed single-piece units lead in sales.

One downtown contractor has the franchise for a patented unit, having taken it over from a special sales agency. Several outside salesmen, working exclusively on commission, have been employed continuously and the results obtained are evidenced by the number of those units sold in various establishments, many of them off the beaten tracks of the other lighting salesmen.

Another contractor has perfected a two piece commercial unit with a corrugated reflector that has proved quite popular. A large number has been installed through his sales efforts.

Some of the contractors prefer to handle certain exclusive numbers of Eastern glass manufacturers. Although the units may not be classed as those best known in the industry they are generally of high class and there has been a marked improvement in the last year or so of the quality of units handled.

Not many of the contractors are equipped with foot-candle meters or equipment other than the data provided by the manufacturers. Generally it is the contractor himself who handles the lighting equipment sales and a number of them have voiced the opinion that additional practical information is needed on this subject and are interested in some form of instruction on the solution of lighting problems. Through the Electrical Cooperative League,

arrangements are being made for a course of study and demonstration, similar to that arranged by the League early this spring for the largest fixture manufacturing company in the city.

Judging by the requests received from architects, merchants, builders and others, the services of the League on commercial lighting problems have proved beneficial both to clients and the electrical industry. This fact is attested by the hundreds of outlets which the League has added to installations as a result of its recommendations.

There are a number of outstanding commercial lighting installations in Denver and records disclose the fact that the League played no small part in "putting over" the idea. The results speak for themselves.

Whether it is a complex or simply a consciousness of the advantages of better lighting, especially of a commercial character, the fact remains that the sale of an idea precedes the sale of merchandise; that education is the most effective weapon against ignorance; that example sets a precedent—and that good lighting can be sold where there is a mind for it.

Denver may not be the best lighted city in the country but it is generally admitted that it ranks with the top-notchers. The electrical industry of Denver is doing its best consistently to sell good lighting.

Public Utility Good Will Advertising

By Norwood W. Brockett*

Director of Public Relations, Puget Sound Power & Light Company, Seattle

THE average public utility has, in the past, been the poorest salesman found in any business. This is especially true when it comes to selling itself to the public. This condition is not to be wondered at. In the production of electric energy, gas or telephone service, and in the maintaining of uninterrupted service these industries necessarily have developed the best engineers in the world and that is equally true of our accountants. Such a utility is generally the only one furnishing a like service in the territory which it serves. Since we are dealing with a commodity which is almost essential to every home, it has not been necessary until recently that we should pay any particular attention to the sales end of our business. When people desired our service, they either telephoned or came to the office and purchased it under the terms and conditions and at the price laid down by the state regulatory body.

Nor did it apparently occur to these utilities that it was necessary to advertise the company itself, the service it was giving or what it was trying to do to help build up the community. For years we proceeded upon the theory that any business institution which treated its patrons courteously, which tried to give the best possible service at the lowest possible cost and which did its full share in the civic activi-

ties of the community, in time must necessarily win the good will of that community.

Unfortunately, this seems to be true of every other line of industry except the public utility business. No utility company has, even today, the same measure of good will with the people which it serves that is enjoyed by the other business houses in the same locality, and the reason for this is very obvious. No other industry in the world has been subjected to the same constant, malicious attacks by the demagogue and the office seeker. When a candidate was unable to obtain votes by reason of his own unfitness for an office, he always was assured of a certain support by launching a malicious attack upon any of the public utilities in his district. Following the belief that we were to be judged by what we really did and not by what some self-seeking individual said about us, we complacently permitted these attacks to go unchallenged and unanswered and neglected to place the truth before the people.

We now have learned, however, that we must not only give good service at reasonable rates but that we also must tell the people we are doing it and publicly disprove the unwarranted attacks made upon us. I know of but two ways in which this can be done—by the spoken and the printed word. I believe the spoken word to be far more effective with the limited number of people that can be reached,

*An address before the convention of the Pacific Coast Advertising Clubs Association, Seattle, June 20-23, 1925.

but to carry our message to the vast majority of our customers the printed word must be used. Unquestionably the most effective method is through the advertising columns of the newspapers.

Those utilities which adopted this policy immediately met the full fury of those demagogues whose chief stock in trade was the vilification of the utilities. They resented having their statements challenged and disproved and realized that their power would be broken when the truth about the utilities became generally known. In self-defense they immediately termed all such efforts by the utilities "propaganda" and glibly talked of "millions" being spent by the utilities in an effort to deceive and mislead the people. Some of the very newspapers whose advertising departments had convinced us of the necessity of such advertising gave free space to those who criticized us for doing it and in a few cases even took us to task in their editorial columns. Gradually, however, the people are beginning to realize that the things which we are telling them are true, and they are beginning to wonder why our industry is not permitted to conduct its business just as every other business is conducted, unhampered by constant political attacks.

Please do not infer that our work has been accomplished. It only has been started. When you can truthfully tell the people that, under regulation, you are permitted only to earn a reasonable return in the shape of interest and dividends upon the actual value of your properties and upon the money honestly and legitimately invested to make the service possible; when you can tell them that since 1913 the cost of living has gone up sixty-five per cent while the cost of electric energy actually has decreased; when you can tell them that the bill for the average residence consumer for electric service, including not only his lighting but all the socket appliances he uses, is less than \$2 a month, he must,

in time, believe that you are furnishing a real service and that you are entitled to his respect and confidence.

In spite of what we have accomplished, the average citizen today still believes that there is something mysterious and unusual about the conduct of a public utility. He still believes that enormous profits are being made by these utilities. While he knows that the governmental bodies have made a colossal failure of practically every line of business endeavor in which they have entered and while he knows that the government could not run his business as economically or as successfully as he can himself, he still has a lurking idea that running a public utility is different and that possibly the city or the state or the national government could be successful in that particular business. He still believes that the water powers of the nation are being "grabbed" by "private interests" and used to exploit the people. He still fails to realize that every kilowatt of electric energy generated from these water powers is sold at a price fixed by his own regulatory body and that tremendous sums are paid in taxes each year as compensation to him for their use. These are some of the problems with which the average public utility is confronted and which can be solved only by taking the public fully into our confidence and by using every medium available to place the true facts before it.

In closing, just a word of warning. Any utility whose house is not in order and which cannot give this full measure of information to the people had better pursue the old policy of saying nothing. Every public utterance by a representative of a utility and every printed line used by it must be the exact and literal truth. Let our opponents spread the falsehood and, while it is going to be a hard, discouraging battle, I personally am fully convinced that in the long run "truth must prevail."

Utah Company Starts Refrigerator Drive With Polar Window

IT is estimated that less than fifty per cent of the households of the country possess refrigerating apparatus of any kind and that less than half of those using "ice chests" are receiving satisfactory service from their equipment. The realization of the wide field thus left open for electric refrigeration among those now only partially served or not served at all, not to mention the greater convenience and the economy of electric operation, has led central stations in all parts of the country to take up electric refrigerating equipment as the next great step in household electrification.

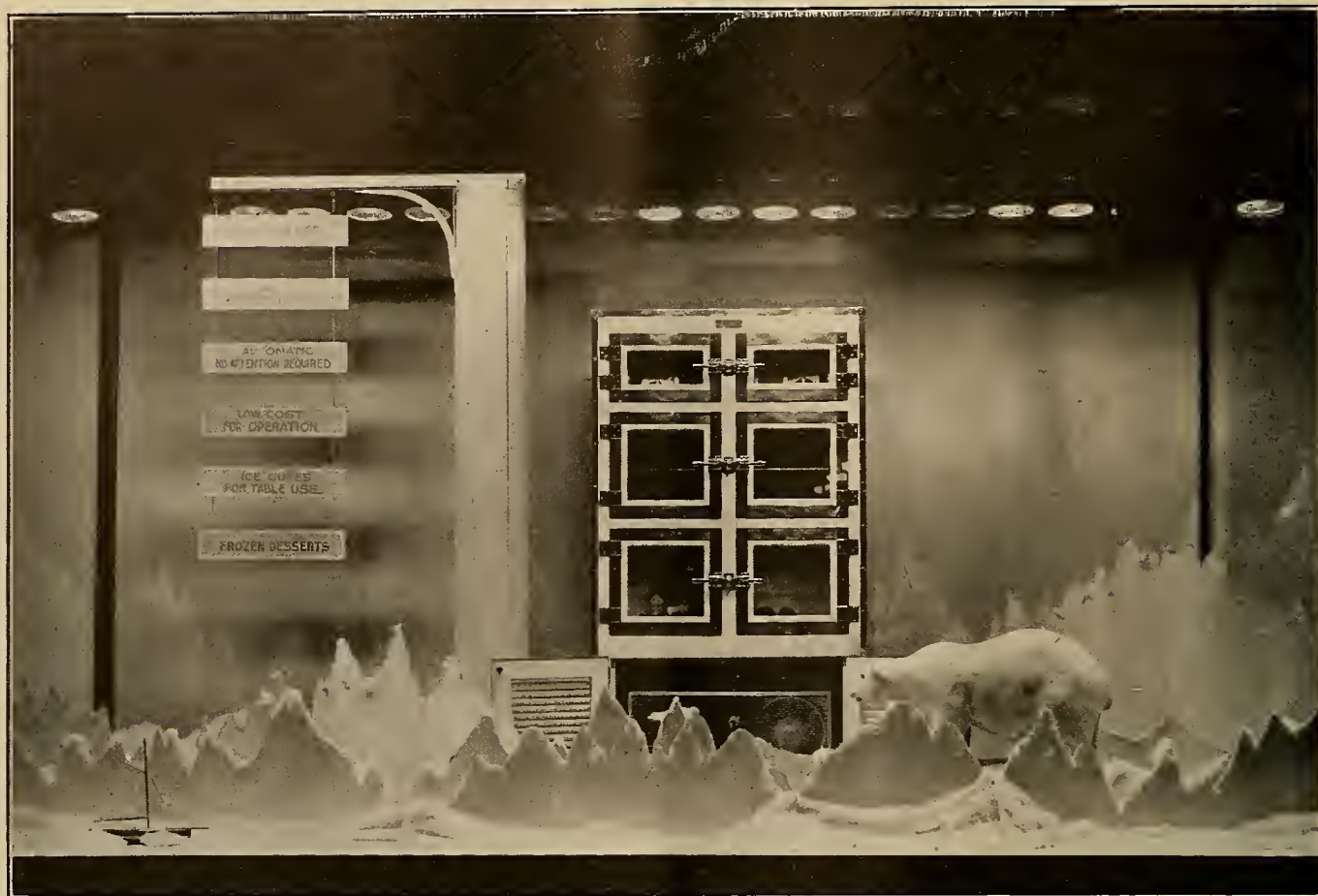
One of the latest recruits to join these ranks is the Utah Power & Light Company, which has started an electric refrigeration campaign in Salt Lake City. This involves a preliminary education of the public through advertising and through personal calls that

already has resulted in numerous sales of equipment within the city territory.

A refrigerator is on display in the company's shop, and much is made of this seasonable atmosphere in window and store decoration.

The present-day interest in polar expeditions and in the far North was capitalized in the recent window which featured the electric refrigerator and which attracted considerable popular interest. This was an Arctic scene with realistic icebergs and a polar bear, among which the refrigerator stood in effective prominence. The polar landscape was manufactured by the use of cardboard cut in jagged outline and covered with cotton batting.

Ice crystals such as are used in Christmas-tree decoration completed the effect. At one side a tiny sailing vessel of the toy variety, covered with "ice,"



Window display of Utah Power & Light Company used to direct attention to the utility of the electric refrigerator.

was frozen into the blue-green ice floe which made the floor of the window; at the other a lifelike polar bear investigated the workings of the refrigerator's machinery. A white painted pillar, presumably the North Pole sought by Amundsen, stood beside the machine giving height to the scene from a pictorial standpoint and, incidentally, bearing in standard form a series of cards which told the story of the convenience of electric refrigeration. "No Food Spoilage," ran the first, followed by: "Always Even Temperature," "Automatic — No Attention Required," "Low Cost of Operation," "Ice Cubes for Table Use" and "Frozen Desserts." These cards were simple and legible and yet decorative in their arrangement.

The white background not only gave an atmosphere of coolness to the scene but provided an excellent contrast to the dark touches and bright metal trimmings of the refrigerator. This equipment, as was desired, dominated the picture and attracted all eyes. A machine with glass doors and three double compartments was displayed. Actual food was kept in storage there so that the refrigerating effect of the equipment in active use might be impressed upon all who passed the window.

The effectiveness of the display was largely due to its strategic location in the "island" window, which is so prominent a feature of the Utah Power & Light Company's new store below the Kearns Building. The frontage is on the main business street and, as entrance to the store must be made

from either side of the window to the open doorway which is directly in its rear, all who had occasion to transact business with the bookkeeping or commercial departments of the company had an opportunity of viewing the scene from all sides. The window is wired completely so that the illumination at night brings out the full effectiveness of the scene. Convenience outlets provide the proper connection for operating the machinery.

In addition to the original artistic display, a temperature-recording machine later was installed in the foreground of the window. This showed graphically on a chart the record of actual temperatures within the refrigerator, demonstrating both the extremely low temperature reached and the evenness with which it was maintained. Inasmuch as the importance of both these features in the preservation of food had been emphasized in all advertising done, this chart was always a matter of great interest. That its message carried its effect was shown by the number of people who stopped and studied it in detail. Through this chart much information was disseminated most effectively.

With the campaign hardly more than started, a sale of more than twenty machines is recorded, with more in prospect. The success of this program, as well as the advantage of the refrigerating load from the company's standpoint, is expected to lead to further sales effort throughout the year and the extension of the campaign to all parts of the company's territory.

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Testing Methods Employed on Transmission Towers

Service Tests of Severest Nature Accurately Simulated by
Testing Rigs at Manufacturing Plant

By C. H. TALLANT
Pacific Steel Company, San Francisco

The importance of long-distance, high-tension transmission in the general scheme of things in Western power development has placed a corresponding importance on the steel towers that support the lines. As each new line has been projected, new ideas have been worked in and new demands made on the steel towers that they may meet most efficiently and economically the conditions of the line in question.

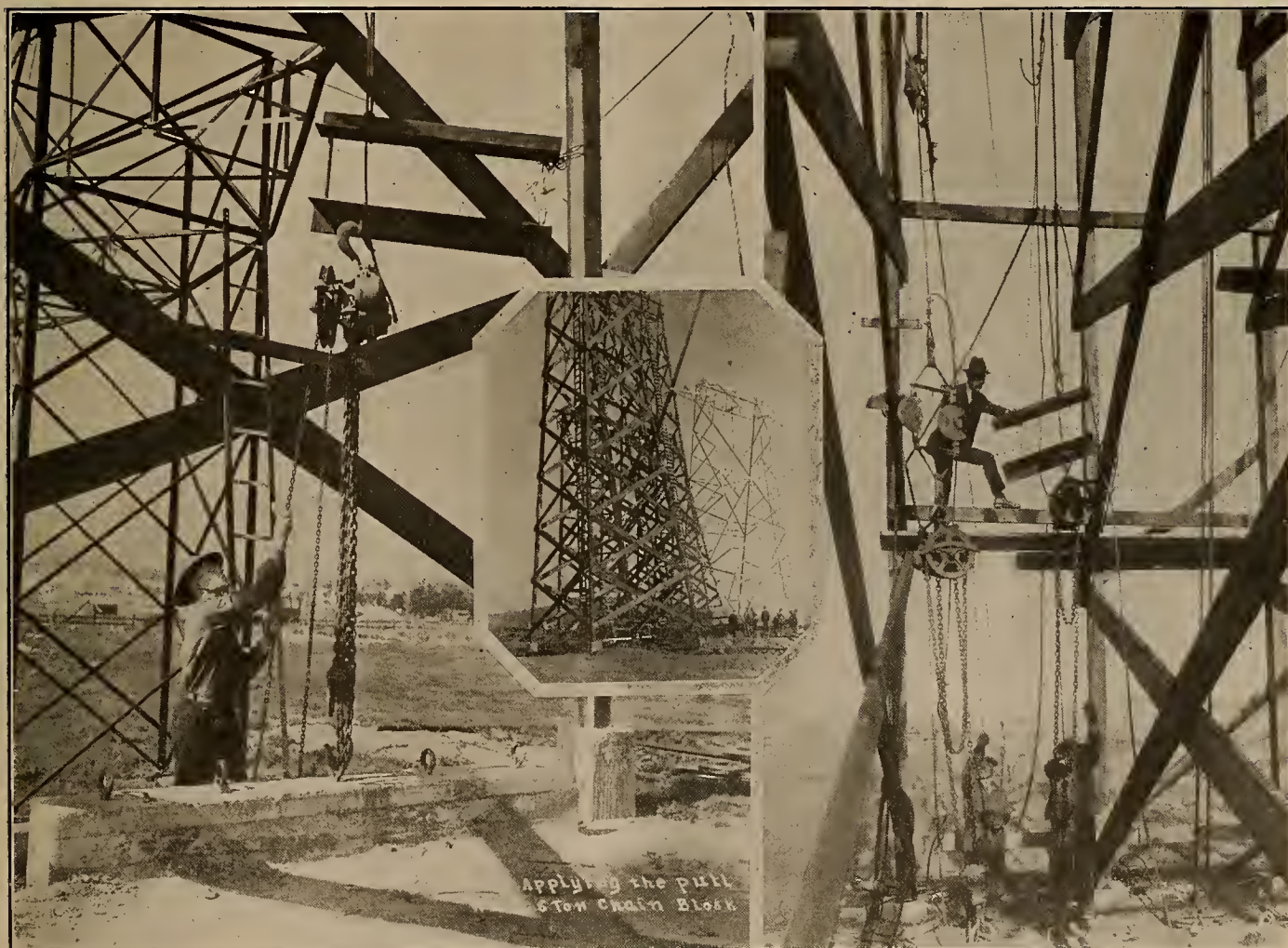
Standardization in design of transmission towers for more than any one

particular line so far has seemed largely impracticable because no two lines have the same combination of voltage, carrying capacity, weather conditions and right-of-way restrictions. Also the time which elapses between the building of one line and the next by any one company is usually such that more or less progress has been made in the treatment of tower design. The towers for each new line, therefore, have been of substantially new design with the attendant variations in stress

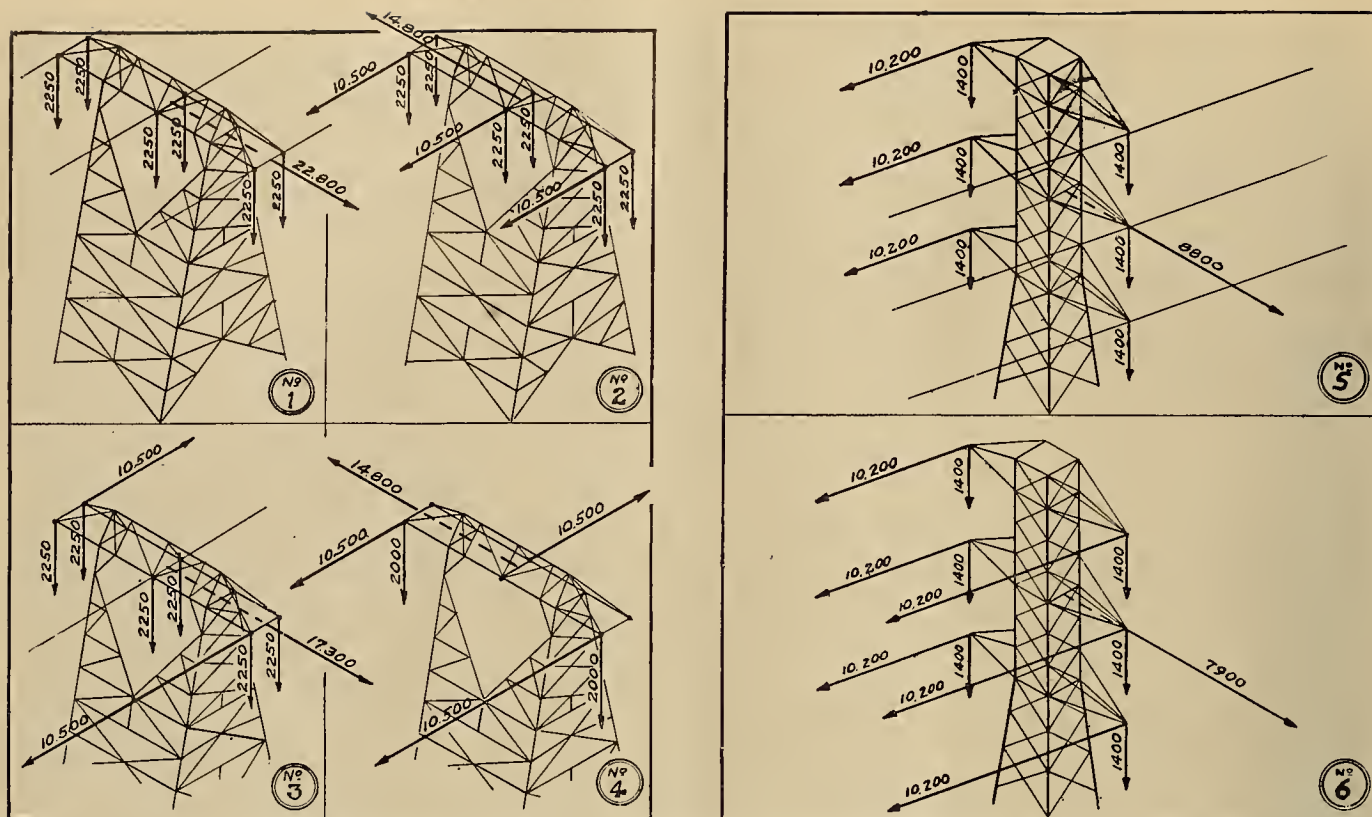
diagrams, details and construction. Some means of learning, before erection in the field, just what each new tower will do when in service is of great value, and it was for this reason that the Pacific Coast Steel Company erected a full-size tower-testing block at its tower plant in South San Francisco.

By means of this testing block, loads of any magnitude and character may be applied to the tower under test and accurate readings taken of the loads as they are applied. The deflection of any specified point on the tower may be ascertained accurately, simultaneously with the readings of the loads. Thus a complete record of the behavior of the tower under test can be obtained.

The three loads or types of loads which are usually applied to towers being tested are longitudinal, transverse and downward vertical loads. These



Showing the methods of applying the test stresses to towers through the use of 8-ton chain blocks. Loads can be applied successively or simultaneously, as desired by the purchaser. Note the dynamometers rigged just above each block for indicating the stress. These are normally read from a distance through transits. The insert shows a single-circuit dead-end snow-type tower under test. A tower similar to this one was subjected to a combined test loading of 104,000 lb. without failure in any member. Note the boom with a loop slung through the tower to prevent the tower from falling in case the tests are carried to the point of destruction.



Showing direction and magnitude of typical test loads as applied to towers on the testing block

three represent, respectively, the stress in the conductors or the torsion and breast pull resulting from broken wire conditions and dead-ending the line, the

pressure of cross winds, and the dead load or weight of conductors and insulators. They constitute the equivalent of the service conditions which the

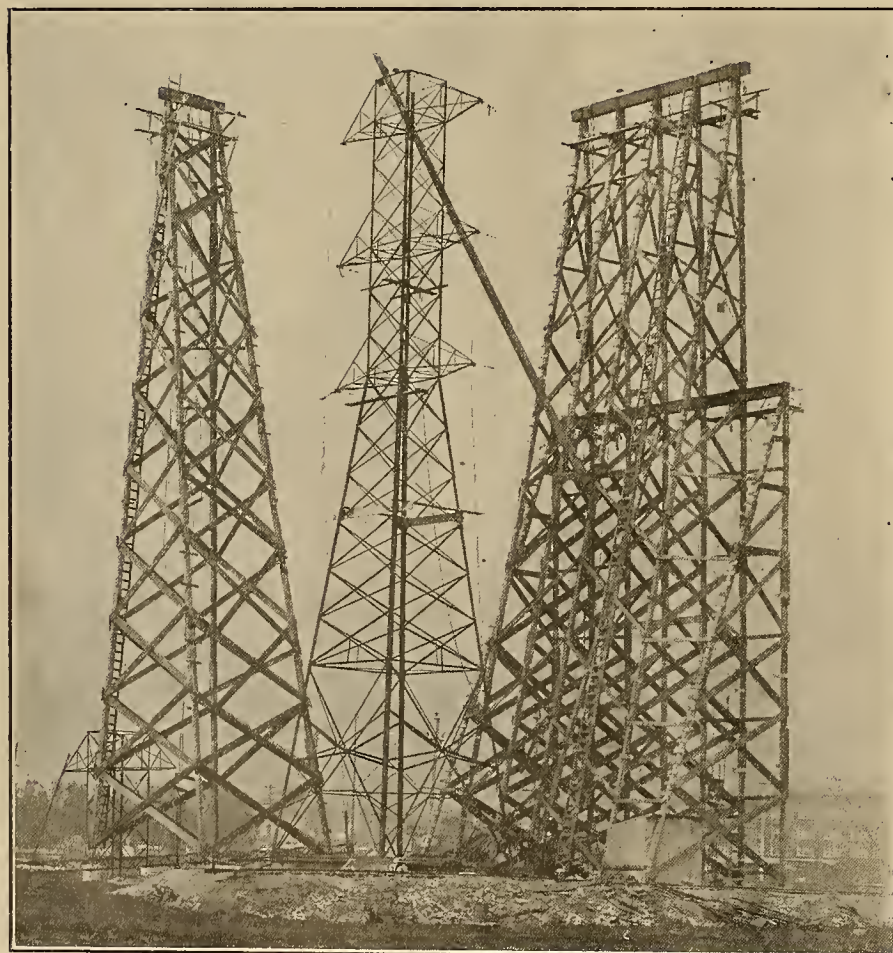
tower is expected to meet, either normal or abnormal.

The amount of each load is dependent upon the line conditions of the particular line and the working stress of the steel which is adopted when the tower is designed. It is common practice in tower design to fix the maximum load which the tower is expected to carry under service conditions. This is called the working load. A factor of safety then is adopted in the ultimate strength of the tower as protection against failure under abnormal stresses. This factor of safety is usually $1\frac{1}{2}$, based on the working loads. Thus, failure of the tower should not occur until a load at least 50 per cent above the assumed maximum service load comes on the tower. It is through enabling the investigation of a tower stressed up to the destruction point, under known load values, that the testing block proves its worth.

The full-sized tower tests on the testing block are always made on a specimen tower before the fabrication of the order. If a weakness develops somewhere in the tower or in the crossarms and failure occurs before the full calculated load has been applied, it is a simple matter to strengthen the member affected. In this way loss occurs from discarded parts or duplicated effort or through the much more serious delay in field erection, as the only thing necessary is a change in the design details covering the weak member.

There also have been instances where towers were found to be designed heavier than warranted by service requirements. The tests on the testing block brought out this fact and resulted in substantial reduction in tower weight through the substitution of lighter members for those which had proved to be heavier than necessary. This, of course, resulted in decreased cost per tower.

As will be noted from the illustra-



Testing a valley-type dead-end tower with over 70,000 lb. horizontal pull. The combined longitudinal transverse and dead loads applied simultaneously to this tower totaled 87,500 lb.

tions, the testing block consists of two heavy wooden frames set with their axes at right angles to each other. A steel base capable of accommodating towers of varying sizes is permanently in place in front of the two wooden structures. Bent angles and plates are bolted onto this steel base at the required points to form the test stubs. The test tower is erected on these stubs and the rigging fastened in place for the test. Dynamometers are used to indicate the loads, and the deflection is read through a transit set up in the field adjacent to the testing block. A measuring scale graduated in inches and fractions is mounted on the tower at the point where the deflection is to be read. Loads are applied in the sequence specified by the purchaser through chain blocks located on the rigging and fastened to concrete anchors. The dynamometers are in place just above the chain blocks. Readings are taken on the dynamometers at stated intervals as the loads are applied and the corresponding deflections read simultaneously. It is thus possible to study the action of the tower under varying stresses, up to the point where destruction may be expected if this is desired, and locate exactly any member which may be overstressed.

Another advantage of testing the specimen tower on the testing block is the opportunity given to try out new ideas or short cuts in erection procedure that have for their object the reduction of the time required to erect the towers in the field.

Complete Line of General-Service Motors Redesigned

With the marketing of a new type of direct-current motor and a redesigned type of alternating-current motor, the General Electric Company now is manufacturing a completely revised line of general-purpose motors. This line includes standard speeds and horsepower ratings for use on standard circuits.

Distinct advantages are claimed as a

result of this revision. The use of the steel-shell babbited bearing has been extended to cover all general-purpose motors. While strongly advocating the use of sleeve bearings, provision also has been made to furnish many standard types of general-purpose motors with ball bearings for use by those who prefer this type. A further advantage resulting from the revision is the fact that some of the smaller direct and alternating-current motors are mechanically interchangeable, rating for rating.

The redesigned alternating-current motors are for use on polyphase circuits and are made in the squirrel-cage and the wound-rotor design. Standard power ratings range from 5 to 200 hp. All are of the skeleton-frame type and include both horizontal and vertical machines. Improved bearing construction is the keynote of the redesign of the alternating current type. Details include larger shafts and bearings, larger oil rings with lower oil level and larger oil-reservoir capacity and other similar features. The improved insulation now included on smaller sizes makes these motors suitable for operation in places where special atmospheric conditions are encountered. The redesign of bearing housings is expected to eliminate minor troubles from oil leakage and to reduce the maintenance cost and amount of attention required.

The new direct-current motors include both constant and adjustable speed machines. In view of the very flexible electrical and mechanical design, many older types now are superseded by the new lines. Thus the same line runs from slow-speed blower motors to high-speed motors for driving pumps, including the intermediate types.

The two-pole machines range in size from $\frac{1}{2}$ to 3 hp., 1,750 r.p.m., and the four and six-pole machines from 3 to 200 hp. Speeds used are 1,750 and 850 r.p.m., these corresponding with full-load speeds for General Electric 60-cycle induction motors. Thus the motors

are made for use on standard circuits of 115, 230 or 550 volts.

The outstanding improvements found in the new direct-current line are mechanical. The standard General Electric steel-shell babbited bearing linings are used except in cases where ball bearings are preferred. The popularity of the riveted-frame construction for small ratings of alternating-current motors led to the adoption of this type of frame in the new small motors.

An outstanding advantage of the standardization of these general-purpose motors is the simplification of the renewal-parts problem with specific reference to bearing linings manufactured for alternating-current types, both single and multiphase, thus enabling motor dealers to supply bearings for either alternating or direct-current motors from the same stock. Most of the bearing linings also are interchangeable in any given type of motor. A total of approximately 2,500 listed ratings utilize not more than 23 different bearings.

Sandstone Rapids Development to Be Full Automatic

The Sandstone Rapids hydroelectric development of the Northeastern Power Company located at Sandstone Rapids, Wis., will be equipped with automatic switching apparatus manufactured by the Westinghouse Electric & Manufacturing Company.

This installation will consist of two 2,400-kva., 6.9-kv., 3-phase, 150-r.p.m., vertical water-wheel generators with 125-volt, direct-connected, flat-compound-wound exciters and operating under a head of approximately 42 ft. The generators will be connected to the line by means of automatic synchronizers which will insure the machines being in synchronism with the rest of the system when the oil-circuit breakers close.

This is the third automatic hydrostation on that company's system. All are controlled by means of the audible-type supervisory control operating over the telephone line connecting the dispatcher with each generating station, and permitting fully flexible operation.

Electrical Device Retrieves 6,000 Sacks Cement

Preventing waste wherever possible is the established policy of the construction engineers of the Pacific Gas and Electric Company. Many small economies run into big money when accumulative results are considered. One such economy was effected on the Pit River No. 3 project. Electrical machines for the cleaning of cement sacks proved to be a valuable investment upon which the return was well worth while.

Somewhere in the neighborhood of 800,000 sacks of cement were used on this job. Most of this quantity went into the dam structure and into the lining of the 4-mile power tunnel. The use of the electrical sack cleaner retrieved some 6,000 sacks of cement that otherwise would have been wasted as far as the job was concerned. While the actual amount of cement saved was only about three-fourths of one per cent of that used on the job, the monetary saving was some \$8,000 net. This amount is worth consideration.



One hawk plus one 44-kv. transmission line equals the results shown above: broken insulators, ruined hawk, line down and several hours service outage. Location—near Denver, Colo.

Service Car Arranged for Tracing Radio Troubles

Portable Radio Set Complete With Loud Speaker and Loop
Aerial Mounted in Coupe for Trouble Shooter

By W. R. CORNELL

Test Engineer, Portland Electric Power Company, Portland, Ore.

Equipment used by the Portland Electric Power Company for locating sources of radio interference is shown in the accompanying illustrations. Fig. 1 shows the general arrangement of the set and auxiliary apparatus mounted on a Ford coupe as generally used. The receiver is strapped to a shelf which is hung from the dash within easy reach of the operator of the car. The loop aerial is supported from brackets on the left-hand door hinges where it can be swung in any direction by the operator and does not interfere with the use of the door. The loop is connected to the set by heavy, rubber-insulated, flexible cables braided together to prevent change in the inter-capacity to leads with resultant detuning of the receiver.

The triangular frame shown is an exploring coil of some two thousand turns of wire which, when connected to only the audio amplifiers of the receiver, enables the operator to pick up audio frequency signals and to follow overhead and underground lines upon which there is a flow of current or upon which a known signal has been imposed. A smaller rectangular coil (not shown) also is made use of in determining upon which one of a number of lines or drops the current causing the interference is traveling. This coil also is used for determining grounds in trees, on poles and other similar locations. It has been found that there often is an audio frequency signal or noise present in the immediate vicinity of the source

of radio frequency interference. The radio receiver indicates the general location of a radio disturbance, but oftentimes fails to indicate the exact source. In these instances the above-mentioned exploring coils are useful.

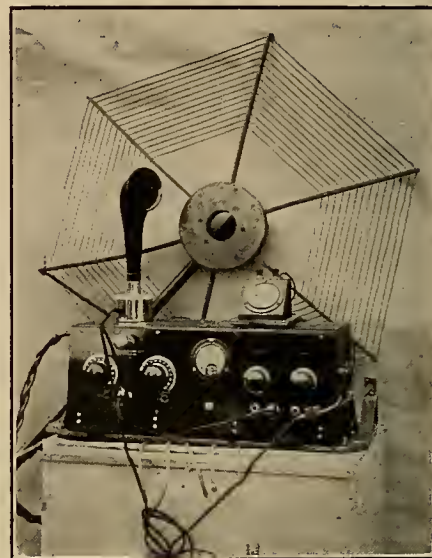
The radio receiver used embodies a slight modification of the "Best" super-hetrodyne circuit. This combination was selected after months spent in experimenting with various receivers and combinations of apparatus. Referring to Fig. 2 it may be noted that the receiver is very compact, measuring approximately 21 in. long, 7 in. deep at the bottom, and 6 in. at the top. The receiver is remarkably stable in its operation, as instanced by distant stations remaining in sharp tune without touching the controls while traveling several miles over rough roads and streets. The receiver is extremely simple in operation. It is necessary only to adjust the two dials shown at the left of the panel after bringing the filament voltage to a proper value.

Signals are made audible with a loud speaker having a small rubber horn placed in the left rear corner of the coupe behind the operator. A thermo galvanometer (shown on top of the receiver) connected to the output of the receiver through a suitable transformer has proved invaluable in determining the strength of signal, condition of receiver and other important information.

The loop is of the hexagonal "pancake" type wound with braid-covered enameled wire supported on bakelite

spreaders. This arrangement has proved to be unaffected by weather conditions. All connections to the receiver are made through standard telephone and cord-tip jacks, allowing the entire equipment to be removed instantly from the car.

Both "A" and "B" batteries are carried under the seat of the car. Ten type UV-199 tubes are employed in the receiver, which is the only receiver found in which there is a complete absence of microphonic noises or ring



Equipment used by Portland Electric Power Company for running down radio interference troubles

from this type of tube. The receiver is shielded completely with 20-gage brass which materially decreases any disturbing influences from electrical equipment on the car. No means has been found, however, of entirely eliminating interference from the ignition spark without destroying the effectiveness of the spark for ignition purposes. A push-button switch has been mounted on the steering wheel of the machine enabling the operator to cut off the ignition momentarily while observing a weak signal.

Presidential Efficiency

According to popular rumor, an aspiring reporter once attempted to interview President Coolidge:

"Do you wish to say anything about the World Court?"

"No."

"What are your views on disarmament?"

"I am not prepared to say."

"Will you state your opinion of the farm bloc?"

"No."

"Have you anything to say about prohibition?"

"No."

"About immigration?"

"No."

"About taxation?"

"No."

The now perspiring journalist turned to go.

"By the way," added the President unexpectedly, and hope arose in the forlorn reporter, "don't quote me."



Radio test car rigged out by the Portland Electric Power Company for use in tracing cases of radio interference

IDEAS FOR THE CONTRACTOR



Exterior of Red Seal electric home opened at Santa Cruz, the first to be constructed under these specifications west of the Mississippi River.

Red Seal Electric Home Opened In Santa Cruz

First Home Constructed Under Red Seal Specifications West of the Mississippi River Supervised by Bureau

The first electric home to be constructed under the Red Seal specifications west of the Mississippi River was opened at 41 Miles Street, Santa Cruz, Calif., on July 24 and will remain open until Aug. 2. It was built and is being exhibited under the auspices of the California Electrical Bureau in cooperation with the electragists and others in the industry in Santa Cruz. George M. Rankin of the bureau is in charge of the home, assisted by M. L. Foster of the Coast Counties Gas & Electric Company.

Three 3-page sections in each of two newspapers were devoted to informing the public of this home previous to its opening. Marked signs throughout the city gave directions for reaching the site by automobile. The home is open from 2 p.m. to 10 p.m. daily and from 12 m. to 10 p.m. on Sundays. At night it is floodlighted.

Red Seal Specifications

The minimum requirements for a Red Seal installation as announced by the California Electrical Bureau are as follows:

General: As a service to home-owners in California, the following requirements for an adequately wired home have been prepared by the California Electrical Bureau and approved by the Society for Electrical Development. These requirements are considered as a reasonable minimum standard, and are based on knowledge and study of pres-

ent-day electrical service and appliances which should be available in the average home.

A copyrighted Red Seal and Red Seal Certificate will be awarded only to residence buildings wired in accordance with these requirements, and will serve the public as identification of buildings so wired.

Wiring plans should be submitted to the California Electrical Bureau, or its accredited representative, for approval before wiring is started. Before permanent Red Seal and Certificate will be issued, opportunity must be given for inspection of finished installation by bureau representative. Also, the entire equipment must be installed in accordance with National Electrical Code Rules, city or town ordinances, and lighting company's rules; and must be inspected and approved by the inspection department having jurisdiction.

Special Requirements

Service—1½-in. conduit or larger, carrying three No. 4 wires, or larger. At the meter location space must be provided for a meter box or board not less than 30-in. x 30-in. for the main switch and meters.

Switches—All switches shall be of the flush type, conveniently located; and where two or more are brought to the same location, they must be grouped under a single plate.

Convenience Outlets—All convenience outlets shall be complete with recep-

tacles of the flush interchangeable type, conveniently located with respect to furniture spaces. Unless otherwise stated in requirements, multiple receptacles under one plate will be counted as one outlet.

Range Outlets—A 1-in. conduit, or larger, must be provided from the meter board to the range location, carrying three No. 8 wires, or larger, terminating in the kitchen in a box equipped with a blank cover, if a range is not to be immediately installed.

Branch Circuits—Convenience outlets shall be wired on circuits of not smaller than No. 12 wire, with a maximum of 8 outlets per circuit. No convenience outlets shall be connected to lighting circuits.

Bells—Wiring for push button for main entrance door and trades entrance, and corresponding bells or annunciators. Provision shall be made for the attachment of transformer or batteries.

Minimum Lighting Wattage—All rooms shall be wired for a minimum of one watt per square foot for general lighting, exclusive of auxiliary lighting (such as table lamps, floor lamps, etc.) which shall be provided for on the convenience outlet circuits.

	Convenience Outlets	Single Pole Switches
Porches		1
Hall (reception)	1	1
(3-way switches required if hall is over 15 ft. long. On all two-story houses, two sets of 3-way switches required, separately controlling lights in upper and lower hall)		
Other		1
Rooms—		
Living	2	1
Parlor	2	1
Library	2	1
Conservatory	1	1
Den	1	1
Sun	1	1
Dining	2	1
Kitchen	1	1
Each bedroom	1	1
Breakfast	1	1
Breakfast nook	1	1
Pantry	1	1
Bath	1	1
Lavatories		1
Clothes closet		1
Attic, with stairway (One outlet for each 300 sq. ft. or less)		1
Basement		1
Laundry	1	1
Garage, built in house	1	1

The Santa Cruz electric home not only complies with these minimum Red Seal specifications, but also exceeds them in that an electric range is actually installed, as well as an electric water heater, air heater, refrigerator, ironer, ventilating fan.

The home will sell for approximately \$6,000; it was built by C. M. Blabon.

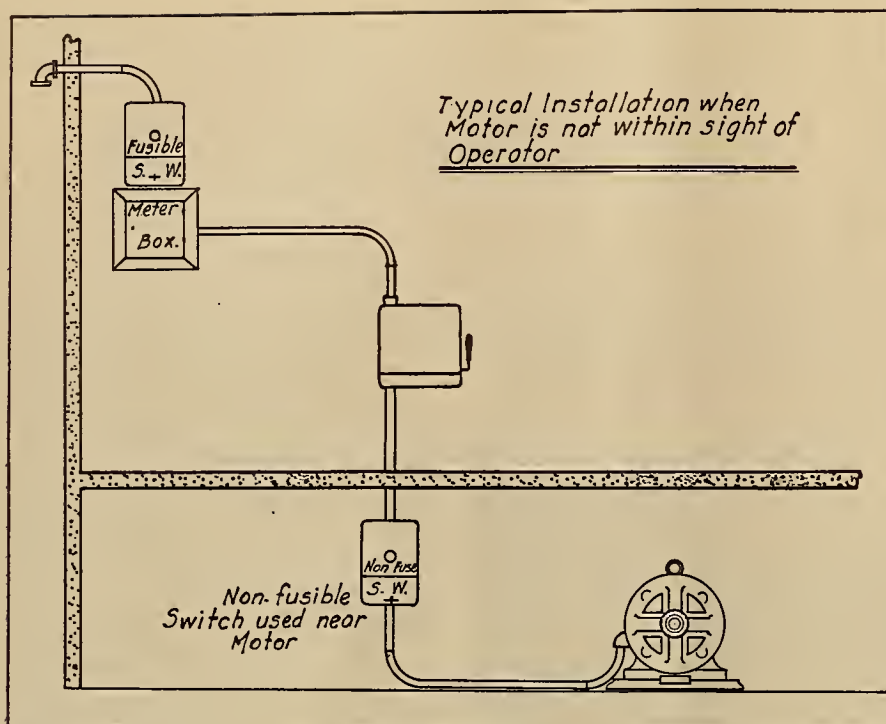


Fig. 2

Safety-First Installations for the Electrical Contractor

The May 15 issue of the Journal of Electricity (p. 370) contained a discussion of a single motor installation where all of the apparatus was in sight of the operator. This was the first of a series of five to appear in succeeding issues which will show five different types of installations commonly made by the electrical contractor.

Fig. 2 shows a typical installation where there is one motor installed but the motor is not within sight of the operator. It will be noted that as in Fig. 1 the service is brought directly to the fusible disconnecting switch just above the meter box and then to the starting equipment, thence down through a floor or through a partition into another room, to a non-fusible disconnecting switch and thence to the motor.

This enables the operator to make sure that the circuit is dead before he attempts to work on the motor, by having a disconnecting switch in sight of

the motor; or, again he can work on the starting equipment and make sure that the line is dead by tripping the fusible disconnecting switch which is in plain view from the starting equipment. This at all times makes the installation safe from the operator's standpoint.

An Effective Electrical Message on Backs of Envelopes

The accompanying illustration shows the use made of the space on the backs of envelopes by the Great Western Power Company of California. The message is printed in bold letters which are very effective. It calls the attention of the reader to the fact that there is a reason for having an electric home and that he should have one.

Many people will read this that otherwise might not read the advertising urging greater electrification in the home. This is an idea which could easily be adopted by electrical contractors and would do a great deal to further the electrification of more homes.

MAKE YOURS

AN ELECTRIC HOME

There's a Reason

Advertisement on the backs of envelopes that conveys the idea of the electric home to the public

Modern Bakery Uses Electricity to Operate All Equipment

A complete electrical bakery recently has been opened by J. A. Suttan, proprietor of the Visalia Baking Company, at Second and N. Court Streets, Visalia, Calif. The pictures accompanying this article show the course of a loaf of bread through this modern plant, from the raw materials to the finished product. The first piece of apparatus is the blender, elevator and sifter into which the flour and other ingredients are placed. This machinery blends, elevates, sieves and weighs the flour. It next passes into the dough-mixer where the doughs are made. The tempering tank where the water is tempered and measured is situated above this. The water for tempering purposes is heated with a Wesix electric water heater. (See view 1, p. 97.)

After leaving the mixer the dough is placed in troughs where the proofing or fermentation process begins; then to the divider, which cuts the dough into small accurately weighed pieces for individual loaves. These pieces are transferred to the rounder by a belt conveyor. This machine rounds the pieces of dough before they enter the proofer. A system of conveyors connects the rounder to the proofer, where the pieces of dough rise to enable good moulding. From the proofer the pieces of dough enter the loaf moulder which shapes the pieces of dough for the pans; view 2. After being placed in pans, the dough is placed in the electric steam proof box where it leavens and rises before going to the ovens. The steam used in the proof box is generated by electricity, which is a recent development; shown in 3.

The pans then are placed in the electric ovens; there are two of these ovens of the two-deck, separate-compartment type constructed of heavy Armco iron. These are manufactured by the Rainier Electric Oven & Equipment Company of Seattle, Wash. Seven inches of block magnesia and air-cell covering surround the ovens to hold the heat. Three-phase 220-volt current supplies the ovens, which have a connected load of 45 kw. each. Each oven, shown in 4, is capable of baking 336 1½-lb. loaves of bread every thirty minutes.

The bread is wrapped in sanitary wrappers by an electric wrapping machine. Even the hot plates on this are heated by electricity. The machine, seen in 5, has a capacity of 1,500 loaves of bread an hour.

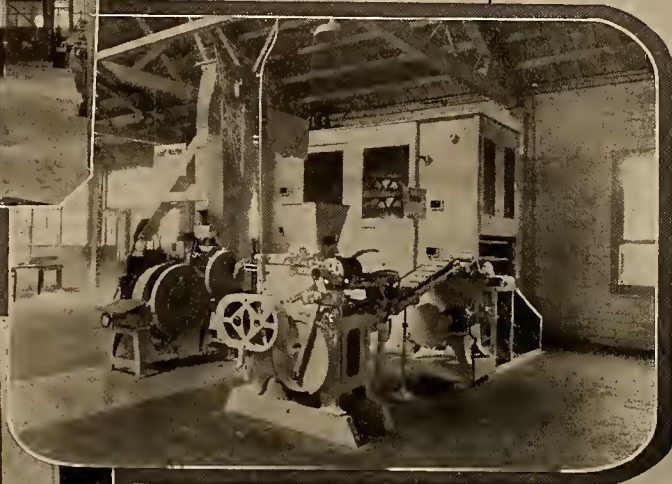
The cake mixer also is operated by electricity, as well as the heating unit in the doughnut kettle. View 6 shows this equipment. Since taking the pictures accompanying this article, an electric steam-generator has been installed to supply steam for the ovens to produce special crusts on certain kinds of bread.

A 400-amp. 220-volt main switch is required to serve the plant. Two 200-amp. 250-volt switches are provided for the electric ovens. Individual switches on the main board control the different groups of apparatus. Six motors have a total connected load of 15 hp. while there is 125 kw. of electric heating load. The electric work was installed by the Visalia Electric Works.

Electric cooking in the home is accepted, but people have just begun to realize that modern bakeries have used electric ovens successfully since 1918.



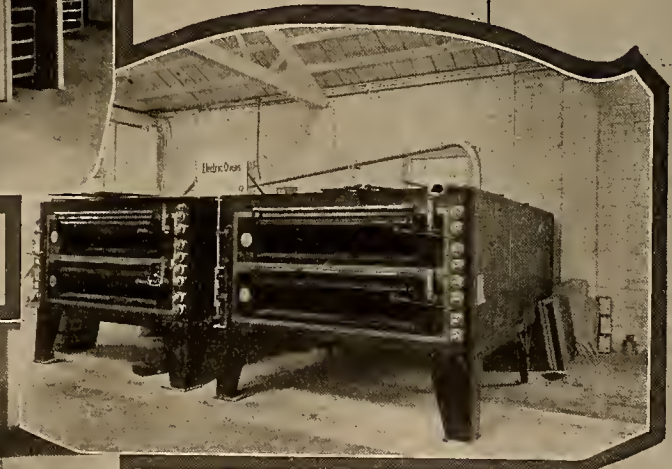
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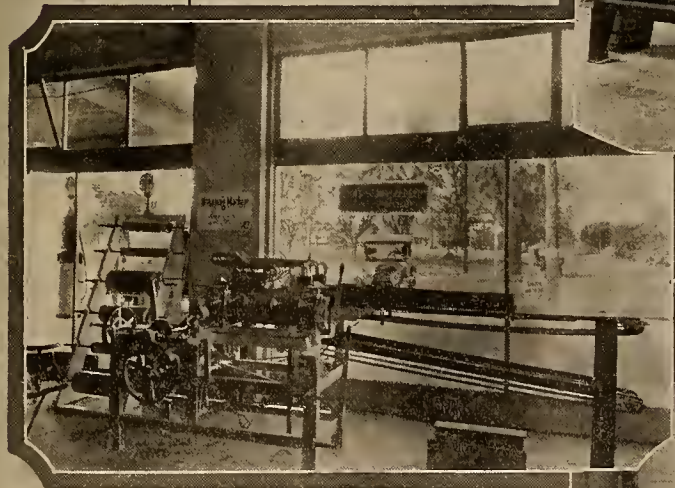
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6

Electrical Estimating for the Contractor — II

A Medium-Sized Power Job Is Analyzed in This Article, the
Second of a Series on This Subject

By J. R. WILSON*

Engineering Department, Los Angeles Electric Works

A contractor has a perfect right to inquire whom he is figuring against, and, if the competition is from a source which is known habitually to practice unethical methods, then the safest policy is to decline to figure the job. Sometimes the owner can be convinced that he is making a mistake in accepting the bid of an unscrupulous contractor.

Each installation is a problem by itself and usually will lend itself to several solutions. This is where the judgment and experience of the estimator will be brought into play to the fullest extent. An experienced estimator should be able to visualize the job and also to transmit this vision to the workman.

The man who can make the most efficient layout usually will get the contract. A thorough knowledge of "substitution of materials" is one of the greatest assets an estimator can have. This knowledge comes only through long practical experience in labor costs, and a constant study of trade journals, price lists, and quality of materials. A material or device that is cheaper in price, or erection cost, without sacrificing quality is the logical one to use. First cost is not the primary consideration, and each device should be considered carefully from a standpoint of efficiency. Usually an estimator's experience will tell him if a reasonable increase, in first investment, will mean a large saving in ultimate expansion cost. When this is so, the facts should be brought to the attention of the customer or should be included in an "alternate" in the bid.

Taking a medium size of power job as an example, and allowing that there are no plans or specifications prepared, let us proceed to analyze the job. The first step is to determine what preliminary information must be obtained, and the following items usually will represent the essential data:

1. Kind of current (a.c. or d.c.)
2. Cycles (if a.c.)
3. Voltage of supply
4. Total connected horsepower
5. Allowance for future expansion
6. Horsepower of each motor
7. Type of each motor
8. Type of each motor control equipment
9. Location of service entrance
10. Location of main switch and meter boards
11. Location of subpanels (if any)
12. Location of each motor
13. Location of each motor control
14. Type of machine each motor drives
15. Erection of motors and control equipment

In a new factory, if the owner has had to buy direct-driven machinery, he will have obtained the necessary information regarding items Nos. 1, 2 and 3 from the power company. If the motors have not been contracted for, or if it is a moving job or a "line shaft" job, the estimator should advise the owner regarding the kind of current available and the best types of motors for his particular installation.

Usually the power company will supply the kind of current desired if the horsepower demand will warrant the investment in service equipment. This applies to voltage of supply circuit. Of course if the power company's distri-

bution system is alternating current and it is necessary for the customer to have direct current the customer usually will be required to furnish the motor generator set, or other converting equipment.

Item No. 4—total connected horsepower—must be ascertained through the customer. (In the articles to follow in this series full details will be given for figuring horsepower requirements for both individual machines of every type, and for group driving through line shafts.)

Item No. 5—allowance for future expansion—is usually one of the hardest problems that the estimator has to face. If he advises the customer to make a large allowance for future needs, the cost of the job is increased to such an extent that the customer immediately becomes suspicious. However, if enough capacity is not provided in the initial installation and the time comes that additional power is required, the necessary change will cost a great deal more money and usually results in expensive "shut-downs." In this respect the estimator is facing a hard problem, because usually the customer can see only the first cost.

The estimator should endeavor to locate the service switch and meter board as close as possible to the logical point of service entrance. The service wiring of course will be the largest wire and conduit on the job, and the shorter this can be kept the lower the cost of increase of capacity will be. With a main service run of around twenty feet the cost of doubling the capacity even 100 per cent, will represent a small amount of money, if made at time of first installation. Usually the greatest part of the cost will be represented by the main service switch. The cost of future capacity must be considered in the light of an investment spread out over a term of years. If in a certain installation it cost say, \$200 to double the service capacity, and the customer should not need the added capacity until ten years later, it would represent only \$32 per year as a "standby" charge, allowing 6 per cent interest.

If the proposition is put to the customer in the above light, he is usually a good enough business man to see the point, especially if the estimator also will explain that the charge at some future time probably will increase the cost at least 100 per cent. The writer is using the above method in his daily work and is getting excellent results.

Item No. 6—horsepower of each motor—must be known not only to figure the individual motor wiring, but also to figure size and capacity of service and sub-feeders. The code specifies that the service and feeders must be large enough to provide for the largest motor in the plant starting, when all other motors are running. (This will be discussed and more fully analyzed later in this series.)

Item No. 7—type of each motor necessary probably will have been determined by the supplier, or must be determined by the estimator. Usually the

customer knows only that he wants to attain certain desired results and must depend upon the advice and honesty of the contractor to see that he gets value and efficiency. A full discussion on the different type of both a.c. and d.c. motors will be included in a later article.

Item No. 8—type of each motor control equipment—usually is determined by the code requirements regarding the horsepower of the motor or type of machinery driven. The code specifies that motors of 2 hp. or less do not require overload, or no-voltage, protection when driving only one machine. Motors above 2-hp. require both overload and no-voltage protection. On motors of 2 to 5 hp. this usually is provided by means of either hand-operated or automatic switches. On motors above 5 hp. of the straight induction type either manual or automatic compensators are provided. On the so-called "high resistor type," across-the-line starters usually are provided, regardless of horsepower. On machine tools and wood working machinery where the motor is not over 5 hp., it is the best practice to provide some type of "push button" switch. The switch should be placed in some location where it will be subject to the minimum of vibration and dirt. The button should be located at the most convenient point for the operator of the machine. On motors over 5 hp. it is good practice to locate the controller on a wall or convenient post or column and provide the machine or machines with "safety stop buttons."

Item No. 9—service entrance location—must be based upon the type of building, code requirements, future additions to building, location of main service switch, and location of nearest power supply. When the building sets "on the property line" some codes prohibit bringing the service wires out anywhere except on wall along street or alley or to point adjacent to fire wall on roof. The service conduit should be so located that it will not interfere with future building additions, and the customer should be consulted regarding his future building plans. The location of the main switch, based upon ultimate power demand, should be determined. Then the most direct run to a point conveniently accessible to available power supply should be chosen. If the installation costs do not outweigh the cost of additional conduit and wire for a longer run, the above location is the one to use.

Item No. 10—location of main switch and meter board—should receive the greatest possible consideration. The cost of the initial installation, and of future power additions, will be regulated to a great extent by the location of the main switch and meter board. Several factors must be considered: accessibility of switching equipment for quick repair and fusing, accessibility of meter for reading and testing, protection of meter board equipment against damage due to trucking, materials falling on, and being placed against it. Another very important factor for consideration is the distance to largest motors, or loads in the initial and future installations. Ample room always should be provided for future equipment. It usually develops that some change will be made when such equipment is installed.

(To be continued.)

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BETTER MERCHANDISING

Attractive Store to Stimulate Merchandise Sales

Utah Power & Light Company Occupies New Location Embodying Modern Ideas in Retail Establishment Layout

A variety of novel features, designed for the convenience of customers and the efficiency of the sales force, have been incorporated in the new store and division office of the Utah Power & Light Company in Salt Lake City. Through careful attention to detail this office, which is also the retail electrical store of the company from which it merchandises a large line of electric appliances, has been made a completely modern retail establishment. The store was opened to the public on March 2.

The new office and store occupies a ground-floor location that is much larger than the old site which was two doors to the north. It exemplifies every modern application of electricity in domestic service, as well as exhibiting the most recently developed ideas in store and window lighting. Though the large store room is brilliantly lighted at all times, no lighting fixture is visible, all being of the concealed type, hidden in artistic coves near the sparkling white ceiling and in ornamental urns on the large pillars inside the store. This new lighting system also enables the accounting department and other clerical employees to work without eyestrain and without the annoyance of shadows.

A floor of rubber tile gives the appearance of marble. This was selected on account of its resiliency, affording patrons and employees an unusual degree of foot comfort. The interior walls are finished in a restful gray, light enough to reflect the artificial light without glare. The woodwork is of mahogany. A large space is afforded for displays of washing machines, ironers, vacuum cleaners, floor and table lamps, ranges, and other domestic electrical appliances. For the convenience of customers comfortable chairs are provided for their use while making selections from the displays. An information desk is maintained to assist persons desiring to visit either the general offices of the company on the upper floors of the building or for those making other inquiries regarding the company's service. A well appointed rest room is found on the west balcony.

The new quarters provide increased counter space and additional tellers' windows for the greater convenience of patrons having business to transact with the application, service or accounting departments. The space given over to the accounting department is greatly increased over that of the former location. This increase was made necessary by the growth of the company's business handled by its Salt Lake City division offices.

Convenient to the front door are located the lamp counter and the office

of the "Fix-it Shop" where customers obtain free repair service on appliances.

The division manager's office is located on the east balcony, reached by a broad stairway from the main floor. Another stairway leads to the basement demonstration rooms. Here an auditorium has been arranged for demonstrations of electric cooking and other domestic applications of electricity, as well as display space for many appliances not shown on the main floor. Salesmen's quarters, the "Fix-it Shop," stock rooms and storage vaults also are located in the basement. An interesting feature of the basement, though not intended as such, is the display of latest approved methods of inside wiring to meet the most rigid requirements of the Underwriters' code.

The show windows, consisting of an island window and large side and back windows, have installed in them the newest development in window lighting, which includes the utilization of color applications for heightening the display values of merchandise, as well as the most modern methods of using reflected and diffused white light. It is expected that the window lighting installation, while it was primarily designed to display the company's own merchandise advantageously, will be regarded as a demonstration of correct window lighting by merchants who are studying lighting methods.

Ample space, attractive and well appointed interior design and arrangement, embracing the most modern and up-to-date features, make the Utah Power & Light Company's new store one of the finest in the West.

BE A DUMB GLUCK AND MAKE A MILLION

By JOE OSIER

When Christopher Columbus first conceived the idea that the world was round and that—

The land of the free and the home of the strap hanger was but a few days' row away—

The Wise Williams, including taxi-drivers, hat check brigands and the boys who bought only bonded warehouse stuff,—

Figured Chris was on the trail of a melancholy bug—that he was light under the lid and—

They avoided him as though he were an income tax collector or an assessor or an insurance solicitor, for instance.

But history tells us, Columbus laughed 'em off. He didn't expect that gang to play Iron-Handed Ernest to him. Anyway, why should he fret? He

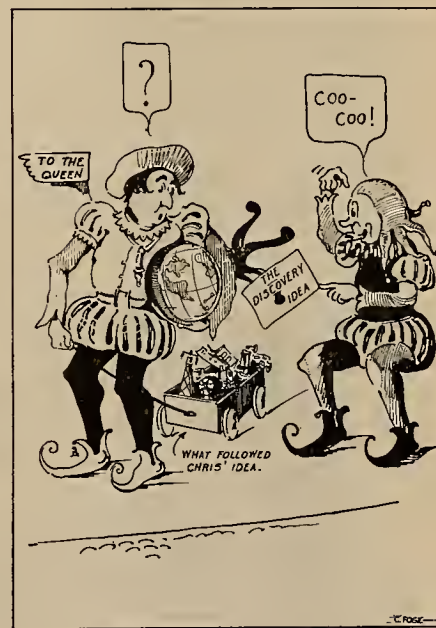
was playing four aces pat and holding a Queen for a kicker, and he was sitting behind a stack of Royal jools.

Well, it is current gossip that he accomplished—I'm not telling anything new. But here is the point:—

Today, as in 1492, when a man springs a revolutionary idea, the wise-aces point fingers at their dumb domes, make funny clucking noises and smart cracks and allow—

That it is all right to talk to oneself provided one does not answer.

Now take the case of an Electrical Contractor-Dealer I know. Because he thinks satisfied customers are better



Do you belong to the coo-coo chorus?

than bullion in the bank; because he insists on service first and profit afterwards, he has been dubbed Dumb Dan but—

I have often noticed that his store doors are always open with folks going in and out.

The Wiseheimers say Dan is dumb because he thinks: "Getting By will insure Getting Sunk": because he says "The customer is always right;" because he will not connive with the other bidders nor will he cut his original bid and—

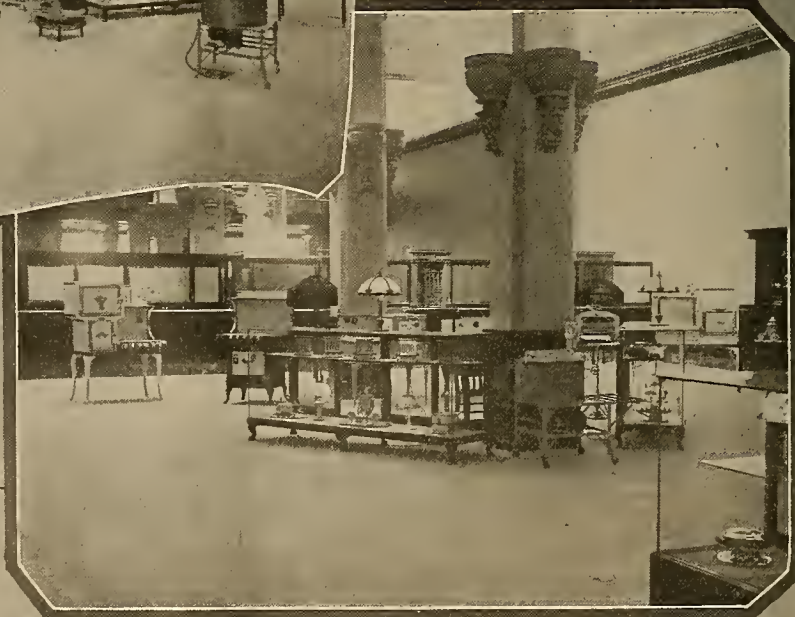
Because he merchandises only the best and stands back of his bargains.

They say he is dumb—that he is one-way traffic in a one-way town and Dumb Dan—

Says nothing. With his four aces pat and his Queen for a kicker, he goes about his business of discovering America. And he plans on building a gold fence around it.



MODERN lighting plays an important part in the new Salt Lake City store of the Utah Power & Light Company. Particular attention also has been paid to the general arrangement of the display room in order that customers may be served most efficiently.



Getting Personal Interest in the Electric Home

San Diego Electric Club and Junior Chamber of Commerce
Stimulate Desire for Home Electrification

By W. A. CYR

Something new has entered into the latest model electric home being displayed in San Diego by the Electric Club in conjunction with the Junior Chamber of Commerce of that city. The new element is not one of equipment nor appurtenance. It is a new angle of view, a new sense of individual interest in the home expressed by the 20,000 people who have viewed it.

In the past, electric homes have been put on display, and thousands have gone through them from a mild sense of curiosity and an impersonal interest in the latest developments in home applications of electricity. Such developments being more or less familiar facts, the injection of a deep personal interest in an electric home is the more remarkable.

This revived interest was no calculated thing. It was purely accidental in this case, and the method of exploiting and disposing of the home was responsible for it.

Desiring to raise a fund for its activities, the Junior Chamber of Commerce of San Diego proposed to the Electric Club the sponsoring of an electric model home, which the chamber could dispose of through tickets to be sold to the public, one of which would entitle its possessor to the home at the end of the contest. The Electric Club was to plan the electric installation, equip the home electrically and provide demonstrators to show the public the uses of electric appliances.

It is this that has brought from the public the personal interest. Every buyer of a ticket for the home immediately has assumed of his own accord a direct personal interest in the building. The home might become his some day, and, therefore, he is keen to note its every particular.

So general is this idea that prac-

tically every visitor to the home may be heard making remarks, half jokingly but with an implied seriousness, about what he or she will do with this room and that room when the home is his or hers. Since the furnishings are not to be given with the home, lively discussions of how the visitor's furniture and effects will fit into the home are a common occurrence.

Many visitors, imbued with this personal sense of ownership, have not been content to visit the home once and let it go at that. They return to revisit and to speculate again on the thought of living in the beautiful home. Some few, more enthusiastic than the rest, revisit the home practically every day.

Naturally the value of this interest from an educational standpoint is immeasurable. Every electric appliance, every electric convenience, is looked upon as a personal possession, without which the individual will feel a definite loss, later. And while some of those whose hearts are most set upon the home are sure to be disappointed, the desire aroused for the electric home is sure to reflect in more complete electrification of their own homes, perhaps in the building of other homes incorporating some of these most desired conveniences.

If such is the case, much good can spring from the new San Diego model electric home, those in the city feel, for the home is a complete and well planned electrical domestic achievement.

Its major electric features are to be found in the refrigerator and the heating system, which are both electric. The refrigerator is a large, enamel-and-nickel-finished unit, permanently installed in the wall of the kitchen, its face extending beyond the wall of the kitchen but two inches. It, of course,

includes a double ice-making chamber, a large food storage chamber, and has the mechanism concealed in the lower chamber near the floor. The convenience of the refrigerator is demonstrated in its accessibility and the fact that there is no necessity for stooping.

The electric heating system, for which a separate closet was built, is of the hot-water circulating type. The water is heated and thermostatically controlled by electricity and is circulated throughout the house by a standard system of radiators. Beside this an electric water heater was installed to provide hot water for bath and kitchen. The refrigerator, the heating system, and the electric water heater are to be given with the house.

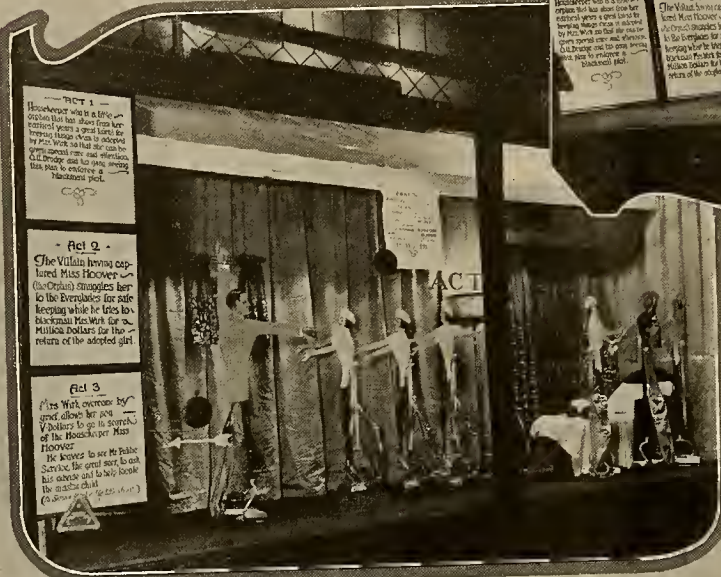
Other electrical features put on display included the usual list of household appliances, range, washing machine, vacuum cleaner, cake mixer, ironer, percolator, toaster, hair dryer, tumbler heater, as well as an electrically operated grand piano, which proved a revelation to many visitors to the home.

The only difficulties encountered have been those of administration. A delay in the finishing caused a postponement of the exhibit, and consequently of the giving of the home. A second postponement of the giving of the home was necessitated because the ticket sale had not reached the goal set by the Junior Chamber of Commerce necessary for a satisfactory settlement to all concerned. A revised campaign for ticket disposal promises to put the ticket sale, which had reached the 10,000 mark July 15, to the required 15,000 by Aug. 1.

From an electrical and educational standpoint, the method seems to commend itself to adoption by other communities. The keen personal interest in the home that has come as a natural by-product of the method of disposition has high potential value educationally to the industry. That it came about by accident and not by design proved a welcome surprise to San Diego electrical men. But its effects being known, other projects of this sort might well be directed to still greater benefits.



Kitchen and living room of the San Diego Electric home, which, because of the manner in which it was displayed, became a matter of personal interest to each visitor. Note the electric refrigerator permanently installed in the kitchen



To dramatize the utility of the electric vacuum cleaner, A. B. Spencer, during a special sales campaign of the Public Service Company of Colorado, used the four displays shown here. Each act appeared in the principal show window of the company's Denver office and was allowed to remain for a period of one week. By using cards carrying the synopsis of the four-act "play" the public was kept informed as to the sequence of the "plot" of the production. As will be noted from the illustrations, all of the characters, with the exception of the villain and his accomplice, were impersonated by vacuum cleaners. The villain and his aide were represented by a carpet sweeper and a broom. The hero, V Dollars—the down payment being featured—returned the heroine to his home.

NEWS OF THE INDUSTRY

Utility's Suit Against Railroad Commission Dismissed

Sustaining the contention of the California Railroad Commission in the action brought against it by The Southern Sierras Power Company, Judge Paul McCormick of the Federal District Court for the southern district of California on July 16 granted the motion of the commission's attorneys to dismiss the suit brought against it by the power company. The suit, which questioned the matter of the commission's jurisdiction and operation, represented the most important attack upon the Railroad Commission made during the last few years.

The company, which operates in the eastern and southeastern portions of the state, asked the federal court to annul two orders of the Railroad Commission, one of which fixed rates to be charged for electric service upon its system, and the other denied an application for temporary rate increases. The court was asked to enjoin the Railroad Commission from enforcing the collection of the present schedule of rates upon this system and also to enjoin the Railroad Commission and all other persons from interfering in any way with the collection of a proposed new schedule of rates 10 per cent higher than the existing rates, save in certain territory in and around San Bernardino, where this company operates in competition with the Southern California Edison Company.

The Railroad Commission, through its attorneys, moved that this complaint be dismissed upon the ground, among other things, that the federal court did not possess jurisdiction to grant the relief asked in this complaint, and upon the further ground that the plaintiff should exhaust its remedies under the state law before going to the federal court. The commission also took the position that since the utility voluntarily itself had reduced a large number of the rates fixed in the commission's order, this company properly could not attack these rates in the federal court. This position was sustained by Judge McCormick. It is not known whether an appeal will be taken by the company.

Customer-Ownership Campaign in Denver Sells 9,100 Shares

More than 9,100 shares of preferred stock of the Public Service Company of Colorado and Cities Service Company were sold in the fourth customer-ownership campaign of the former company that closed recently. In the eleven days of the campaign, according to a report of Guy W. Failer, vice-president of the company and in direct charge of the activity, 8,612 shares of stock were sold by employees and about 500 shares by the securities department.

The results compare favorably with the first campaign when a record num-

ber of shares was sold to customers throughout the properties of the company, including its subsidiary at Cheyenne, Wyo. Even in Denver where the company recently was refused a franchise extension until a later election a record number of shares was sold.

Jack Barker, purchasing agent of the company, and his department led in sales, both as to total shares and the highest average per man. Winifred Ralston of the publicity department won the prize for women employees by placing 66 shares. Outside of Denver the Fort Collins office topped the state properties, while C. J. Hancock, manager of the Clear Creek district with headquarters at Idaho Springs, reported high individual sales of 200 shares. The next customer-ownership campaign will be conducted in November.

Delivery of Hetch Hetchy Power Scheduled for July 31

Delivery of power from the Moccasin Plant of the City of San Francisco's Hetch Hetchy development to the Pacific Gas and Electric Company was scheduled to start July 31, according to reports received from the power house on July 28. Two of the four 20,000-kva. units will be put on the line to start with, and it is hoped that the others may be in service by Aug. 12.

The damage to two of the penstock lines that was brought about by an operating error on June 30 (Journal of Electricity, July 15, 1925, p. 66), was repaired, and on July 23 water was turned into them for tests. A small leak near the surge chamber developed in one of the lines, necessitating the unwatering of the penstock. This leak was repaired and on July 28 water was again turned into the two lines. Plans on that date provided for a three-day drying-out period before the units were put on the line supplying power under the contract between the city and the Pacific Gas and Electric Company.

The repairing of the other penstocks has been a little more difficult. Indications are that the third and fourth units will not be ready for service prior to Aug. 10.

Pasadena Plant to Burn Natural Gas.

—The Pasadena municipal light and power department is installing gas burners under the boilers in the steam plant to replace oil burners now in use. Since natural gas can compete very favorably with fuel oil at \$1.18 or more per barrel, it is expected that this change will save the city a considerable sum each year. Los Angeles Gas and Electric Corporation has contracted to furnish one year's supply of natural gas and is speeding up work on a pipe line to carry this fuel to the city's station. Consumption will approximate 3,000,000 cu. ft. of gas per day.

New High-Tension Crossing to Be Constructed by B. C. Utility

Permission to construct a high-tension crossing of the Second Narrows, Victoria, B. C., has been requested of the Dominion Department of Public Works by the British Columbia Electric Railway Company, Ltd. Specifications for the line, which will be carried on steel towers, are being prepared. The tower on the north shore will be 300 ft. high, and that on the south shore 150 ft. high. In addition to the two main towers there will be three heavy anchor towers. The cost of the work is estimated at \$60,000.

The new crossing is necessitated by the fact that the Dominion Department of Public Works notified the utility company that its lines must be removed as they were in the way of dredging operations. The towers to be installed will carry two lines, there being a third one across the inlet at Barnet.

Storms Do Little Damage to California Systems

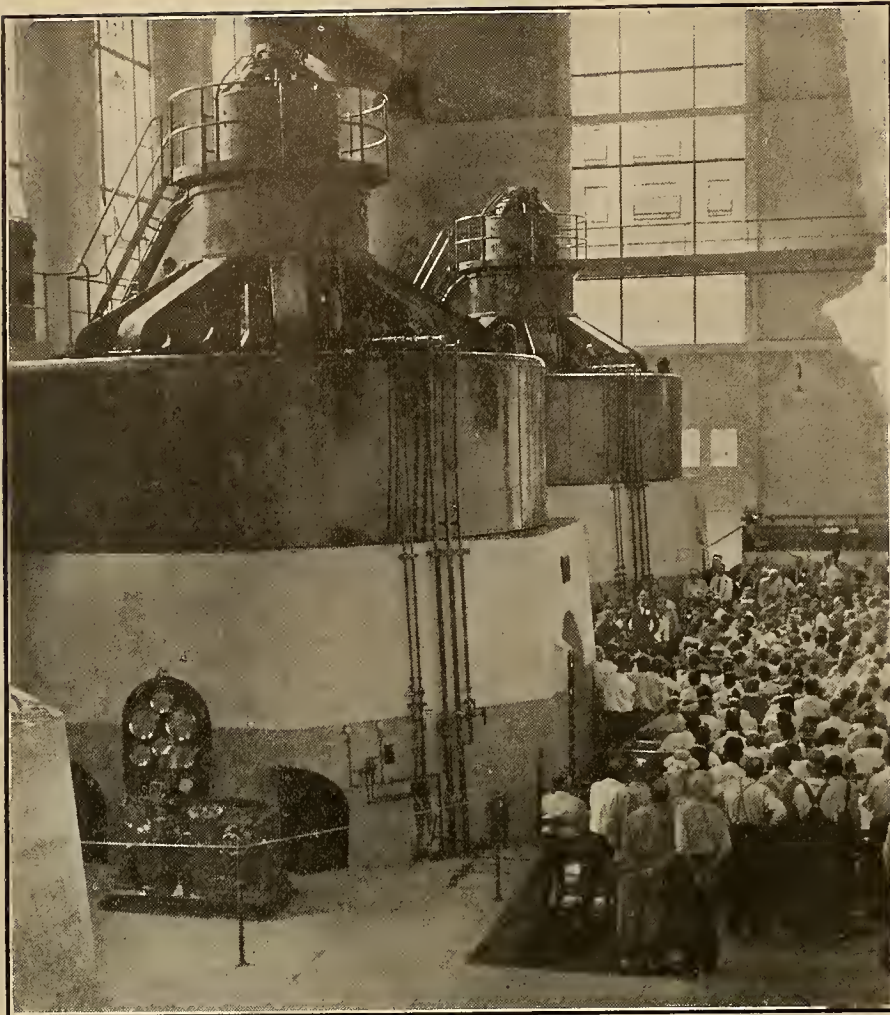
Temporary interruption to the service to the cottages and tents around Huntington Lake, in central California, was reported by the Southern California Edison Company due to the high winds which occurred in that vicinity July 14. Damage was very slight and was confined entirely to distribution lines serving resorts around the lake. Construction equipment was unharmed by the storm, and the high-tension lines furnishing power for the camps back of Kaiser range were not affected.

None of the major equipment of the San Joaquin Light & Power Corporation in the San Joaquin Valley was damaged in any way. A few poles and small transformers were lost due to lightning.

Progress Report on Balch Plant of San Joaquin Company

A progress report of work on the Balch Plant of the San Joaquin Light & Power Corporation, Fresno, Calif., states that the two-mile road from Balch camp to the power house site has been completed and the 7,000 ft. of road to Williams Crossing has been cut through to Farnham dam site. The penstock site has been cleared of brush and trees, and incline equipment from Kerckhoff dam will take care of construction work on that part of the project. A sawmill is also in operation. Preparations are well under way for the 19,550-ft. tunnel from Williams Crossing to the power plant, the work to be superintended by Ed. ("Tunnel") Fox.

A description of the Balch plant was published in the Journal of Electricity, April 1, 1925, p. 241.



Interior of Pit 3 power house, showing two of the three units, during the dedication ceremonies.

Pit 3 Is Dedicated Officially and Put in Service July 18

Formal ceremonies, to dedicate and place in operation Pit No. 3, the fourth hydroelectric plant of the Pacific Gas and Electric Company on the Pit River in northern California, were held on the afternoon of July 18 in the new power house. The dedication, under the chairmanship of Frank A. Leach, Jr., vice-president and general manager of the company, was witnessed by two hundred and fifty editors, engineers and company employees from northern and central California who were the guests of the company on a three-day excursion which started from San Francisco July 17.

Pit 3 power house is located on the Pit River 11 miles below Pit 1, which was placed in operation three years ago. The new plant contains three 33,000-hp. vertical reaction turbines operating under a head of 280 ft. and direct connected to three 27,000-kva. generators. Power is stepped up to 220 kv. through three banks of 30,000-kva. transformers and is transmitted over an 8-mile extension to the original 220-kv. lines leading from Pit 1 to Vaca-Dixon substation and thence over these lines to the lower end of the Sacramento Valley, a distance of 200 miles. The Pit 3 development was completed in twenty-three months at a cost of \$13,500,000.

Complete details concerning the hydraulic and electrical features of the project will be presented in the Aug. 15, 1925, issue of the Journal of Electricity.

The Pit 3 Dedication Trip

The party invited to be present at the dedication ceremonies was transported to Mt. Shasta City by a fourteen-car special train and thence over the McCloud River Lumber Company's railroad to Bartle. The 35-mile trip from Bartle to the power house was made over the Pacific Gas and Electric Company's construction railroad, the party arriving at 4 p.m.

The dedication ceremonies commenced at the power house as soon after arrival as possible. Mr. Leach in his opening remarks gave a brief description of the work involved in the harnessing of that portion of the Pit River involved in the Pit No. 3 development, and then introduced A. H. Markwart, vice-president in charge of engineering. Mr. Markwart gave a brief summary of the engineering features of the project and paid tribute to the various chiefs of design and construction in his department. P. M. Downing, vice-president in charge of electrical construction and operation, discussed briefly the

problems incident to that portion of the work coming under his jurisdiction, giving credit to the splendid performance of his department managers.

The first unit was started by Miss Bernice Downing, editor of the Santa Clara Journal. The second unit was started by E. C. Hutchinson, vice-president and general manager of The Pelton Water Wheel Company, and E. O. Shreve, San Francisco district manager of the General Electric Company.

Following the dedication exercises, the guests spent an hour inspecting the switchboards, outdoor bus structure and the plant itself. The party then was taken to Pit 3 Camp where, after dinner, they gathered to hear more of the details concerning the Pit River development. Mr. Leach introduced R. E. Fisher, vice-president in charge of public relations and sales, as chairman of the evening. Moving pictures showing the progress of the work on the development were presented to give a pictorial story of the project. Mr. Markwart, the first speaker, gave a full discussion of the engineering features involved in the design and construction of the Pit River Development. Mr. Downing, speaking next, delivered a discussion, illustrated by lantern slides, that presented graphically the topographical conditions entering into the company's plans for the development of the river. Among the other speakers who addressed the visitors were: Harris J. Ryan, professor of electrical engineering, Leland Stanford, Jr., University; C. L. Cory, dean of the college of mechanics, University of California, and Irving Martin, former member of the California Railroad Commission, who discussed the responsibilities of the company in connection with furnishing service to the public. Mr. Martin spoke concerning the need for cooperation between power and irrigation interests so that the greatest good might come from the use of the water resources of the state.

On Sunday morning the dedicatory exercises for the storage reservoir formed by the Pit 3 diversion dam were conducted. C. P. Cutten, of the legal department of the company, delivered an address eulogizing the late John A. Britton and in honor of him named the body of water "Lake Britton". O. W.



P. M. Downing, vice-president in charge of electrical construction and operation; O. W. Peterson, engineer of general construction; and G. M. Wherle, in charge of Pit 3 construction, look over some of the work that has been completed by their company.

Peterson, engineer of general construction, gave some of the technical details concerning the construction of the dam which impounds a lake nearly nine miles long.

This closed the formal part of the excursion. The guests left the Pit 3 Camp at 2 p.m., arriving at Mt. Shasta City at 6:30. The special train was boarded



Frank A. Leach, Jr., one of the editors on the trip, getting the story of Pit 3 from J. Charles Jordan. (Mr. Leach, by the way, is vice-president and general manager of the Pacific Gas and Electric Company).

there and the return to San Francisco was started, the party reaching the city at eight o'clock Monday morning.

The entire excursion was organized admirably and nothing was omitted that might make for the comfort of the guests. Despite the fact that the trip



The mess hall at Pit 3 Camp was one of the most popular places.

was made during an exceedingly warm spell, arrangements made beforehand provided maximum comfort for the party. Mr. Fisher was responsible for all of the arrangements, and was assisted by practically all of the division and district managers and many of the local agents of the company.

Pacific Company Issues Booklet for Public Relations

As a new step in the public relations work of the Pacific Power & Light Company, Portland, a twelve-page booklet, 4 x 8 in. entitled, "Introducing Pacific Power & Light Company", has been issued for the purpose of handing or mailing to every new customer as he applies for service. Its attractive make-up invites reading, for with its eleven illustrations of company properties interspersed through its 775 words of reading matter it presents to the eye an appeal not easily disregarded.

Stating the reasons for the distribution of the booklet, under the first heading "Introducing Our Company to You", it says: "If you were opening an account with a strictly merchandising establishment you would be able to form a rather accurate idea of the sort of business it was by a personal inspection. A personal inspection of our plants and service facilities would mean hundreds of miles of travel and is, of course, impracticable." The booklet then proceeds under the next heading, "Interesting Facts", to tell something of the company's properties, and continues with short discussions of the following subjects, "Finances and Ownership", "How We Measure Your Service", "Electrical Merchandise", "State Regulation", and concludes with "Our Ambition: To Serve You Well". The center double-page spread is given over to a map of the company's system.

Southern Sierras Company Gets Pumping Power Contract

The Southern Sierras Power Company, Riverside, Calif., has contracted to furnish power to operate pumping plants for a new irrigation district in Lower California being opened by the Delta Canal Company of Calexico, Calif. The known territory in which underground water may be pumped in sufficient quantity for irrigation purposes covers an area twenty miles long, ranging in width from three to six miles. Approximately 200,000 acres of cotton-growing land, for which gravity water from the Colorado River cannot be used because of location, will be made available through this development.

Comparative costs of central station with Diesel engine power were carefully analyzed, and, though it is necessary to transmit the power a distance of over 500 miles from generating plants in Inyo and Mono Counties, the former was decided upon as the more efficient and economical.

General Electric Company Chairman's Address on New York Farm Electrification Published.—The address of Owen D. Young, chairman board of directors, General Electric Company, delivered in Albany, N. Y., before a meeting of representatives of farm, university and electric public utility organizations under the auspices of the Empire State Gas and Electric Association, has been published in pamphlet form. The subject of the address was "Farm Electrification in New York State." In it Mr. Young told how the farmer, the power company, the manufacturer, and the state could cooperate to bring about farm electrification in the state.

Lighting Educational Committee Presents Final Report

The final report of the Lighting Educational Committee, giving a tabulation of the results of the Better Home Lighting Contest, has been published. The 40-page booklet contains a full report of the activities of the committee from the time that the purpose of the contest was defined until the final awards were made to the school children winners.

The organization of the campaign, methods of reaching the children, statistics detailing the coverage secured, financial scheme employed and a discussion on what the Primers revealed, are among the interesting subjects covered in the report. General comment in regard to the effectiveness of the campaign, together with reports from the regional directors is extremely interesting.

In discussing the basis for future activity, J. E. Davidson, chairman of the Lighting Educational Committee, reaches the following conclusion:

The work the Lighting Educational Committee undertook in this movement has been completed, but the work of the industry has just begun. It should be evident to everyone that, through this great educational activity, we have assumed a new obligation to the consuming public—an obligation which can easily be met without financial sacrifice, and one which must be met if we are to foster and develop the goodwill and friendly public relations resulting from the contest. The electric lighting industry must make it easy for the user of light to secure types of equipment which will provide the proper lighting described in the primer and approved by the industry as a whole. It must encourage the use of such equipment by precept and example as well as by sales policies and by sales effort; it must keep faith with the public.

The task of fulfilling this obligation has been left in the hands of a great industry and a strong army of individuals—men with foresight and vision and perseverance. The industry is already at work, and the public will benefit from a real lighting service.

Copies of the report have been sent to a limited number of persons and companies. There are a few additional copies that may be secured by addressing the Lighting Educational Committee, 29 West 39th Street, New York City.

Pump Standards Published by Hydraulic Society.—Recommended standards of engineering in the pump industry as set forth in the recently published booklet (third edition) of the Hydraulic Society should do much to assist both the manufacturer and the user of this equipment. The publication is quite complete, covering accepted principles of business conduct as adopted by the society, classification of pumps, nomenclature, definitions, service recommendations, installation instructions, motor ratings, friction tables and general information. Copies of this 34-page booklet may be obtained from any manufacturer who is a member of the Hydraulic Society or from the secretary, C. H. Rohrbach, 90 West Street, New York City.

Westinghouse Awarded Contract for Steamship Equipment.—The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been awarded the contract for installing four 300-kw. turbo-generator sets, 500 12-in. stateroom fans, and 90 motors, 56 of which are watertight, on the steamer Malolo now being constructed in the East for the Matson Navigation Company, San Francisco.

Nine Merchandise Sales Programs Prepared by Pacific Gas and Electric Company

Nine complete sets of sales plans, detailing the methods to be followed by the Pacific Gas and Electric Company in its campaign to place 150,000 hp. of load on its lines in the next six months (Journal of Electricity, July 1, 1925, p. 33), are being prepared by the company for distribution to manufacturers, jobbers and dealers interested in the sales program of the company. The bulletins cover the company's plans from the announcement and aims of the campaign to detailed information concerning the methods of making and completing sales.

A separate sales program has been prepared for each of the following classes of merchandise; ranges, water heaters, kitchen lighting units and lamps, air heaters, store and window lighting, industrial lighting, industrial heating, and commercial heating and cooking. The purpose of the bulletins is to acquaint the merchandising branches of the electrical industry with the features of the sales program that has been adopted and to offer these branches of the industry the fullest opportunity to cooperate with the company to the advantage of all. Active participation in the campaign planned is desired by the central station, which also intends to offer manufacturers the opportunity to hold meetings of sales forces to acquaint the salesmen of both the company and any dealers who cared to attend with the important selling points of the manufacturer's line.

The plans covering the entire list of current-consuming devices covered in the sales program provide in general that the company will stimulate the sale of these both through its own specially recruited sales force of 200 men and through dealers by assisting them in the selling and financing of the merchandise.

Sales plans for the merchandising of electric ranges, water heaters, kitchen-lighting units and lamps, and air heaters, have been prepared and will be mailed to interested persons in the near future. While all plans are made for each particular class of merchandise and are governed by different conditions, the first three will give a general idea of the sales drive organized by the company.

Range and Water Heater Plans

The company plans to place 4,000 electric ranges and 2,000 electric water heaters on its lines before the end of the year. To do this it will employ about thirty additional salesmen to cover its territory. In addition, electrical dealers and a few large household furnishers have been given the opportunity to cooperate with the company by selling ranges under three distinct arrangements.

The three dealers' sales arrangements will be offered according to the classification made of the dealer by the local division sales manager. The arrangements for the three classes which are defined are as follows:

Class 1. Dealers who display continuously in a prominent position on the sales floor five electric ranges, of the same or different makes, one water heater and one air heater; and in ad-

dition advertise this merchandise regularly.

The company will sell these dealers electric ranges and water heaters at a very low price. These dealers may secure the purchase order for themselves and get the customer to sign the installation term contract furnished by the company according to the fixed schedules, collecting 10 per cent of the installation term price. This installation term contract with the down payment then may be turned over to the company which will arrange for the installation of the equipment. If the dealer prefers, he may pay the installation cost to the company which will arrange for installation, allowing the dealer to handle the entire transaction with the customer.

Class 2. Dealers who do not meet requirements of Class 1, but who carry ranges purchased either from jobbers or the power company.

Jobbers will be able to sell these dealers at a price less than that offered by the company. Installation arrangements are the same as for Class 1.

Class 3. Dealers who carry no stock of ranges or water heaters but who make sales.

These dealers will be supplied with Pacific Gas and Electric Company purchase contracts. On selling a range or water heater to a Pacific Gas and Electric Company consumer, the dealer will collect 20 per cent of the installed term price and will turn this over to the company with the contract. In return he will receive as commission 20 per cent of the cash price of the merchandise. If he is a contractor also he may submit an estimate on the cost of installing the equipment. If the estimate is considered correct by the company's inspector he will get the job without competition; if not, the work will be open to bids from three contractors. If the purchaser is not receiving electric service from any power company the purchase contract must be accompanied by a contract for electric service taken from the Pacific Gas and Electric Company.

Sales made directly by the company will be handled by the regular water heater and range salesmen and the special sales force of thirty. To prepare the way for these men, advertising in local papers will be used as well as direct-by-mail broadsides. These broadsides will reach the prospective customer three days prior to the call of the salesman. In preparing the prospect list the company will use its "meter route stencils" and will regard every domestic consumer with an average monthly lighting bill of \$3 or more as an excellent prospect for an electric range and water heater. Sales will be made either for cash or on a small monthly installment contract covering both the cost of the equipment and installation. A 10 per cent discount will be allowed for cash. If an order for a range is secured by a dealer cooperating with the company, the salesman will receive the same commission as if he had made the sale. This will secure cooperation between dealer and company salesmen.

Installation Arrangement

The installation arrangement prepared provides that the company will handle all of this, at fixed prices, whether the equipment is sold by a dealer or company salesman. The installation prices as set are as follows:

Territory 1.—This territory includes the incorporated cities of San Francisco, Oakland, Berkeley, Richmond, Emeryville and San Leandro.

	Terms.	Cash
Range only.....	\$60	\$54
Range and water heater.....	80	72
Water heater only.....	30	27

Territory 2.—All other territory served by the Pacific Gas and Electric Company.

	Terms.	Cash
Range only.....	\$40	\$35
Range and water heater.....	60	54
Water heater only.....	30	27

These schedules apply where the cost of installation to the company does not exceed \$100 for the installation of the range, \$130 for installation of range and water heater and \$40 for water heater only, in Territory 1; and \$80 for range, \$110 for range and water heater and \$40 for water heater in Territory 2. In exceptional cases where the cost would exceed these figures the customer would be asked to pay the amount over the maximum allowance.

Installation of all of this equipment will be handled by contractors operating on the company's system. Bids for each installation will be requested of three contractors, the lowest bidder to receive the work. The contractor will be paid by the company.

Kitchen Unit and Lamp Sales Plan

The program for selling 20,000 kitchen lighting units calls for the use of about ninety specially trained company salesmen and the sale of this equipment through electrical dealers in the company's territory. Company salesmen will be assisted by prospect cards made out in the consumer's name. Each salesman will take about 30 of these cards, covering that number of prospects in close proximity to each other and will be expected to interview them during the day. In addition to making an effort to sell one of the units, the salesman will endeavor to get information regarding the number of appliances in use in the home visited. These cards will be returned to the local office of the company and the information that they contain will be used later in the sales campaign. Upon sanction of the division sales manager other members of the merchandising branch of the electrical industry will be permitted to make use of the information secured in this manner.

Where prospects cannot be sold one of the kitchen lighting units the salesmen will endeavor to sell a 100-watt lamp for lighting the kitchen. Results obtained by other central stations in kitchen unit campaigns have indicated that one of each ten prospects interviewed purchased units while seven of the ten purchased lamps of larger wattage. The kitchen units offered are of two types, one with a combination convenience outlet and switch, the other with no switch. The first is listed at \$7.50 installed with 150-watt lamp; the second, installed with the same type lamp, \$6.50. These prices are on a term contract providing that the unit is to be sold with no down payment and paid for at the rate of \$.75 a month, this amount to be added to the lighting bill. If cash is paid for the unit, a 10 per

cent discount is allowed. Lamps purchased will be charged on the consumer's next monthly lighting bill.

Contractors to Install Units

Installation of the units will be by contractors, selected as nearly as possible from the neighborhood where the unit is to be placed. In order to secure the best results from the campaign, the company feels that the units must be installed within twelve hours after the order has been taken. This fact will be considered when appointing the contractors to install the units. If the neighborhood contractor can guarantee to install them within the twelve-hour period, he will be given the work and will be paid at the rate of \$1 per unit hung. If this cannot be guaranteed by the neighborhood contractor, the company will be forced to go outside of the district to secure someone to hang the fixtures.

Dealers' cooperation in the selling of the kitchen units is to be secured by the placing in the hands of those desiring to sell the units a stock which will be on consignment. These are to be displayed by the dealers and are to be used as samples. When the dealer secures an order for one of the units from a Pacific Gas and Electric Company customer, he will have the consumer sign one of the company's purchase orders. This order will be turned over to the local office of the utility and the dealer will receive a commission of \$1. He then can install it and get the \$1 allowed or the company will attend to the installation and collection of the purchase price.

Present Activities

At the present time thirty special salesmen of the company are developing range and water heater sales in the San Francisco Bay region. Their efforts have met with considerable success in the first two weeks that they have been soliciting in a house-to-house canvass. Ninety men are working on the kitchen unit and lamp sales campaign in San Francisco and the territory north of the San Francisco Bay. As soon as this region has been covered completely the salesmen will be moved to another section of the company's territory.

The Great Western Power Company is cooperating with the Pacific Gas and Electric Company under the same program as given above. The quotas established by the Great Western Power Company are given on this page.

California "Dirt" Farmer on Railroad Commission

Leon O. Whitsell, a farmer of Orange County, Calif., has been appointed by Governor Friend W. Richardson a member of the California State Railroad Commission, succeeding Egerton Shore, resigned.

In making the appointment Governor Richardson said in part:

"I am selecting Leon O. Whitsell as Railroad Commissioner because he has the necessary ability, vigor and integrity for this important position; because he is a real 'dirt' farmer, with a farmer viewpoint; because he has the legal learning needed to cope with the commission's problems, and because he comes from the southern portion of the state. Mr. Whitsell lives on a farm in Orange County, has been prominent in farm circles, and is intensely interested in agricultural problems."

Electric Truck Enthusiasts Meet In Portland

In a spirit of cooperation, and with a view to seeing what could be done to promote an interest in the use of electric trucks in Portland, seven men representing the two power companies, the storage battery companies and the truck companies met for an informal dinner, July 10, in that city. General conditions affecting the operation of electric trucks and the field for their use were discussed. No permanent organization was formed, but the meeting adjourned with the intent of commencing again early in the fall to organize a definite program of promotion, it being generally conceded that a promising field exists in Portland.

Leaders in the movement were: H. E. Cowgill, Commercial Truck Company; J. D. Sinnot, Exide Storage Battery Company; J. D. Scott, Commercial engineer, Portland Electric Power Company; A. L. Apperson, power salesman, Portland Electric Power Company, and R. W. Faville, sales engineer, Northwestern Electric Company.

New Illumination Process to Be Used by Los Angeles Firm

Manufacture and installation of electric signs utilizing a new process of illumination, developed from the liquidation of the rare gases extracted from the air, will be the aim of a corporation recently formed in Los Angeles. The company is a consolidation of the Electrical Products Corporation of that city, and the Claude-Neon Lights. Prominent financial interests of Los Angeles also have entered into the organization of the company.

The new concern will retain the name of the Electrical Products Corporation and will specialize in standard types of electrical signs as well as theater lighting, outdoor and indoor illumination. Paul D. Howse will retain presidency of the company.

Exclusive sales rights for Claude-Neon products for all territory west of the Rocky Mountains, including the state of Colorado, are held by the newly organized company.

Great Western Announces Quotas in Power Sales Program

The Great Western Power Company recently has announced the quotas established for that company in its sales program from July 1, 1925, to Jan. 1, 1926. The company expects to sell 5,000 kitchen lighting units, 2,000 ranges, 1,000 water heaters and 2,000 air heaters during this period.

An adequate number of salesmen will be in the field to carry the plan to its completion. The details of its selling program is identical with that of the Pacific Gas and Electric Company as given on page 106 of this issue.

League Conference to Be Held Sept. 8-12.—At a meeting of the executive committee of the League Council, representing the association of local electrical leagues and clubs, held at Hot Springs, Va., June 5, it was decided that the League Conference would be held at Association Island, N. Y., Sept. 8-12. Attendance at the conference will be secured by invitations sent out by the Society for Electrical Development and the League Council.

New Domestic Refrigeration Rate Filed by Utah Utility

The Utah Power & Light Company has filed with the Public Utilities Commission of Utah a new rate schedule providing for a special domestic refrigeration rate for electric current. Heretofore domestic refrigeration has not been included in its rate schedules.

The new schedule virtually gives consumers the choice of three rates: 10, 5 or 3 cents per kw-hr. The 10-cent rate is the regular lighting rate, subject to 10 per cent discount for prompt payment. The 5-cent rate is the new special refrigeration rate, also subject to a prompt payment discount of 10 per cent. The 3-cent rate is the cooking rate, which has been in effect for some time in the company's territory.

A customer who receives only lighting service from the company may operate his electric refrigerator on the lighting rate through the same meter; or such customers may have a separate meter installed for current used in domestic refrigeration and pay for such current at the 5-cent rate. Customers who now have electric range service on the 3-cent cooking rate, also may operate a domestic electric refrigerator without an additional meter, paying the same rate for refrigeration as for cooking.

Where the special meter for refrigeration service is installed, the monthly minimum charge is \$1.11 gross, subject to 10 per cent prompt payment discount.

Westinghouse Opens Engineering Division in San Francisco

An engineering division, to pass upon the engineering features of specifications and negotiations as well as to assist customers in their engineering work, has been established by the Westinghouse Electric & Manufacturing Company in its San Francisco office. The division will cover the complete field of engineering as far as the various products of the company are concerned.

A. W. Copley, for the past five years general engineer for the Pacific Coast territory of the company, has been named manager of the new division. Mr. Copley has been with the company for twenty-two years and during the last few years has been dealing particularly with hydroelectric developments. In addition to his duties as manager of the new division he will retain his position as general engineer for the San Francisco, Los Angeles and Denver offices.

The other members of the new division are F. L. Boissonnault, control engineer; P. B. Garrett, automatic control engineer, and P. B. Plass, motor engineer. These men have had several years experience with the company at its East Pittsburgh works.

Valuation Hearing Date Set on San Francisco Power Distribution Systems.—The California Railroad Commission has set the dates for the hearings on the application of the City and County of San Francisco to the commission to fix the condemnation valuation of the distributing systems of the Great Western Power Company and the Pacific Gas and Electric Company. The hearing relative to the former company will be held Sept. 7, 1925, and the latter Sept. 14.

Baker River Plant and Substation Nearing Completion

The Puget Sound Power & Light Company has announced that its substation at Beverly Park, near Everett, Wash., will be completed in September. It will be the largest outdoor substation in the Pacific Northwest, and will have an installation of seven 4,500-kva. transformers. Energy will be transmitted to the station from the company's Baker River plant at 110 kv., and will be stepped down to 55 kv. Two outgoing lines will connect the station with the Broadway substation in Everett. Energy will be transmitted to Seattle over the lines which recently were constructed between Everett and the Puget Sound city.

The completion of the Baker River plant, together with the company's substations at Sedro Woolley and Beverly Park in effect will make Everett a central point in a power system that will extend to British Columbia on the north, to the Columbia River on the south and eastward as far as Wenatchee.

It is stated by company officials that the Baker River plant will be in operation, and delivering some 40,000 hp. of energy within eighteen months from the date on which it was started, or during the month of September.

Contractor-Dealer Stores Badly Damaged by Earthquake

The accompanying pictures of shops and places where shops used to be show the losses which were sustained by contractor-dealers in Santa Barbara after the recent earthquake. Picture No. 1 is the shop of the Nielson-Smith Electrical Company, the oldest established electrical house in the city. No. 2 is the location of the shop pre-

viously occupied by McGeary and Sons. No. 3 is the front of the store of the California Electric Company with a show case containing electric appliances on the sidewalk with the sign "Let's forget it and eat! Cook with electricity!" immediately above it. No. 4 is a snapshot of Fred Downer of Fred A. Downer and Company. No. 5 is another view of the location of the store of McGeary and Sons.

The letter from C. J. Geisbush, executive secretary of the Southern Division of the California Electragists, which is reprinted on page 78 of this issue contains some first hand information on the conditions existing in Santa Barbara and should be of interest to everyone.

Denver Electrical Cooperative League Holds Dinner Meet

Earl E. Whitehorne, member of the McGraw-Hill Company staff with headquarters in New York and vice-president of the National League Council, was the guest of honor and principal speaker at a dinner meeting of the Electrical Cooperative League in Denver, July 20.

Various phases of commercial activity, especially reflecting the atmosphere of the recent N.E.L.A. convention in San Francisco, were discussed. Mr. Whitehorne stopped in Denver while on his way East from the convention.

Although the hottest weather in recent years was being recorded in Denver, it is reported that there was a record attendance. It was the first meeting of the year under the direction of the new league administration headed by A. C. Cornell, as chairman. Ernest P. Kipp, W. R. Kaffer, K. L. Francis, Clarence Keeler and Robert Miller composed the committee on arrangements.

Expansion of Seattle's Skagit River Power Project Urged

J. D. Ross, superintendent of lighting, Seattle, in his annual report urges the expansion of the Skagit River hydro-electric power project to a point where the plant output would be 200,000 hp. He contends that the normal growth of the city light plant's business will warrant such expansion. He particularly emphasizes the need for the development of the Ruby Creek unit of the Skagit.

Mr. Ross states that a 200,000-hp. plant could be placed at Ruby Creek for \$11,000,000 and could deliver power at the city limits for the cost of \$55 per horsepower installed. His report states that this figure includes a railway from the present plant to Ruby Creek at a cost of \$1,000,000, and an arch dam to be installed under the supervision of the federal government at a cost of \$2,000,000. This dam would impound water for a plant of 175,000 hp. at Ruby, Mr. Ross states. He declares further that this storage still would make the Gorge unit reliable and yet permit the installation of the third 25,000-hp. generator in that plant, or even a 50,000-hp. generator if desired, as water will be available up to that amount.

Substation to Be Built in Seattle.—The Puget Sound Power & Light Company is to start immediately upon the erection of a \$100,000 substation at 2203 East Pine Street, Seattle. The structure will be two stories high, 133 x 41 ft. in size, of reinforced concrete construction, faced with ornamental brick and trimmed with cast stone. The cost named will include the installation of electrical equipment.



Typical scenes of contractor-dealer stores in Santa Barbara after the recent earthquake.

Announce Preliminary Plans for Camp Cooperation V

The organization of the next conference of electrical leagues and clubs—Camp Cooperation V—to be held at Association Island, Henderson Harbor, N. Y., Sept. 8-12, inclusive, and sponsored by The Society for Electrical Development, is going ahead rapidly.

Among the subjects that will be included in the business program are the following: What Leagues are Doing; Planning the Business Program and Financing a League; Managing League Activities; The Social Side of the League; League Industrial Activities; Local Legislation and The Red Seal Plan. One of the interesting and important league sessions also will be devoted to women's work in the electrical industry.

Prior to the conference there will be a meeting of the board of directors of the Society, and during the conference week there will be special sessions of the league council; league secretaries and managers; advisory publicity council of the Society, and the electrical transportation group. The conference itself will close with a banquet at which there will be several speakers of national prominence.

Technical Section Meeting Dates Tentatively Selected

According to R. R. Cowles, chairman P.C.E.A. Technical Section, of the Pacific Gas and Electric Company, San Francisco, the tentative dates for the first of the technical conclaves will be Sept. 23-26. This series of meetings will be held in Los Angeles in accordance with the schedule previously decided upon by the executive committee. Detailed information further than this is not available at the present time, but will be announced later.

By placing the first conclave as stated above, a reasonable length of time after the close of the conclave will be available for those who are to go to the first of the national technical gatherings to prepare for the trip. According to the present plans of the Technical National Section, this first inter-divisional conclave will be held in Detroit, Oct. 6-9. The second conference is scheduled for Kansas City, Feb. 9-12, 1926. A meeting of all geographical Technical Section chairmen will be held in Chicago Aug. 5, the place to be announced later.

Associations File Petitions for Special Ornamental Lighting Posts.—Wilshire Boulevard Association and West Wilshire Improvement Association of Los Angeles, Calif., have filed with the city council's traffic and lighting committee petitions for the installation of ornamental lighting posts of a copyrighted design for Wilshire Boulevard from Westlake Park to Fairfax Avenue. The posts selected are to be copper plated cast iron 26 ft. in height and are to be for exclusive use on Wilshire Boulevard.

Gorge Creek Tunnel Suit to Be Tried in Fall.—The case of Storrie & Company against R. M. Grant & Company (Journal of Electricity, June 15, 1925, p. 597), involving the sale of Seattle's Skagit power project bonds, has been placed on the calendar of the federal court in San Francisco. The trial is expected to start early in the fall.

P. C. E. A. Technical Section Executive Committee Makes Report

A red-letter year for the Technical Section, P.C.E.A., has just drawn to a close. Increased efficiency in organization, better service and assistance to member companies, better attendance at meetings, greater cooperation with the Technical National Section, and broader contact and a wider horizon of vision for members may be credited to the conscientious hard work put in by the retiring chairman, P. O. Crawford, and his staff. A report and comment upon the past year's activities and those projected for the ensuing year as submitted by Mr. Crawford are as follows:

"The executive committee of the Technical Section is grateful to member companies, officers of the association, and section members for their hearty support of the work during the association year just completed. This support helped the section to do its bit toward developing the art, reducing costs, and improving its organization.

"The work and schedule of conclaves for the year were planned at an executive committee meeting held in San Francisco in August. At the September conclave in Los Angeles the bureaus were organized and definite studies decided upon. The second conclave held in San Francisco in January saw good progress in the year's activities which were brought to a final conclusion at the March conclave held in Fresno. This latter was of vital importance in that it took the place of the usual convention. The large attendance, of from 100 to 145, at these conclaves gave an excellent opportunity for personal contact and interchange of ideas, and resulted in lively bureau meetings. The members were given a comprehensive picture of all section activities at luncheon meetings addressed by the bureau chairmen. Supplementing the routine work, the members were addressed at the general meetings on subjects of interest to the section by men prominent in the industry. The speakers at the Los Angeles meeting were H. A. Barre and Harris J. Ryan; at San Francisco, F. A. Leach, Jr., Waldo Coleman, John D. McKee, S. J. Lisberger, and C. T. Hutchinson; at Fresno, A. Emory Wishon and A. G. Wishon.

"To avoid interrupting the work at the end of the year and to improve efficiency generally, the executive committee modified the section organization so that each committee chairman would be assisted by a vice-chairman. This vice-chairman will become chairman the following year. It further was decided to have the studies for the ensuing year determined by the retiring committee at its last meeting. Through these changes it will be possible either to reduce the number of meetings per year or to increase the quantity of work handled. The use of the name "bureau" for the divisions of the section was abandoned in favor of "committee," which conforms with the Technical National Section nomenclature.

"All the work of this section tends toward greater efficiency and reduced costs in the technical phases of the industry. However, some of the outstanding feature of this year's work have a direct bearing on reduction in investment and operating costs. As submitted to the technical national chairman, these subjects are as follows:

"Education of Metermen" will tend toward increased efficiency.

"Relay Calibration" will result in improved reliability.

"Study of Low First Cost Methods of High Tension Metering."

"Study of Meters" to prevent loss of revenue through over-metering.

"Study of Oil Circuit Breakers" already installed for purpose of increasing their rupturing capacity.

"Study of Oil" in an effort to select one that will serve for all oil-immersed apparatus.

"Study of Relays and Relay Application" to prevent loss of revenue due to unnecessary interruptions and damage to equipment.

"Fire-Fighting Equipment" for protection of electrical apparatus.

"Hydroelectric Plant Layout" gives industry benefit of best practice in selection and arrangement of plant equipment.

"Analysis of Plant Outage Due to Hydraulic Troubles."

"Studies of Fuel Oil Burning and Condenser Troubles" will affect improved steam plant economies.

"Study of Duct-Line Temperature and High-Voltage Cable," both of which will permit more efficient use of underground cables and ultimately will lead to higher voltage and greater capacities.

"Revision of General Order No. 64." If accepted by the California Railroad Commission, will mean saving through reduction in pole height and simplification of construction.

"Studies by Pole Committee" will tend to economy in steel poles through standardization and savings in wood poles through data on strengths and treatments.

"Transformer Standardization" will mean lower erection costs and reduced stocks.

"Testing Insulators in Service" and "Hot Line Maintenance" will mean reduced operating costs.

"Mr. N. W. Cummings, of the California Institute of Technology, at Pasadena, Calif., making an investigation of the evaporation losses from reservoirs asked the association for assistance in this work. After a thorough investigation by the hydraulic power bureau it was decided that \$400 be contributed to this research for the purpose of instruments. The results of this investigation should be available for publication with the section report for 1926.

"The technical section of the P.C.E.A. has received favorable comment from the officers of the Technical National Section because of its large representation at the eastern meetings, and the work accomplished in connection with the national program of co-ordinating the activities of the national and geographic divisions. Following the established custom of sending its officers as delegates to the eastern meetings, Messrs. Peabody, Steinbeck, Corbett, Talbott, and Gaylord were sent to St. Louis; and Messrs. Cowles, Searle, Porter, Jenkins, Schnell, and Crawford to Cleveland. This contact is of advantage to the section not only in technical matters but will mean a broader administration of section affairs and greater benefits for member companies.

"The committee is indebted greatly to the president and the secretary of the association for their kind assistance, and also to the Journal of Electricity for the manner in which was handled the publicity in connection with the section work of this year.

"Much credit is due the bureau chairmen for their conscientious and untiring effort in carrying out the year's program. In addition to this they have collected a large amount of data for the national section.

"A summary of the report of each bureau chairman covering the past year's work and that projected for the coming year is given in the following tabulation:

SUBJECTS FOR STUDY

Accident Prevention—J. M. Buswell, Chairman

1924-5

First Aid Training.
Code of Safety Rules and Safe Practices.
Company Organizations for Accident Prevention.
Accident Prevention Course for Linemen.
Safe Practices.
Safe Tools and Devices.
Safety Bulletins.

1925-6

Accident Statistics.
Best Form of Safety Code.
Best Form of Organization.
Accident Prevention Courses.
Interchange of Important Safe Practices.
Safe Tools and Devices.
Distribution of Safety Bulletins.

Inductive Interference—L. J. Corbett, Chairman

Routine Telephone Co-ordination Problems.
Cooperation with national committees in gathering data on existing parallels.
Radio Interference.

Routine Telephone Co-ordination Problems.
Cooperation with national committees in gathering data on existing parallels.
Radio Interference:
1. Equipment and Methods Used in Detection.
2. Educational Publicity.
3. Classification of Radio Troubles in cooperation with the national committee.

Underground Systems—C. H. Jenkins, Chairman

Cable Splicing.
Duct-Line Temperature.
Manhole and Conduit Construction.
High-Voltage Cables—35 kv. or higher.

Cable Terminals, Pot-heads.
Kenetron Testing.
Preventing Deterioration of Metal Service Pipe.
Sheath Currents.
Cement Conduit.
Junction Boxes—Reduction in Wall Space.

Hydraulic Power—R. M. Peabody, Chairman

*Hydroelectric Plant Layout
Discharge Coefficients Through Large Rectangular Openings.
Investigation of Silt Deposits in Canals, Flumes and Settling Basins.
*Mechanical Reliability of Hydroelectric Units.
Hydraulic Turbines.

The Effect of Speed Regulation and Water Hammer on the Design of Pressure Relief Valves, Penstocks and Surge Chambers.
Mechanical Reliability of Hydroelectric Units.
Investigation of Silt Deposits in Conduits.
Obstruction in Flow Due to Vegetable Growth in Conduits.
Painting of Penstocks.
Specifications for Welded and Seamless Pipes.
Evaporation and Percolation in Storage Reservoirs.
Expansion Joints in Penstocks.

Overhead Systems—E. Y. Porter, Chairman.

*Revision of Overhead Handbook.
Line Construction Costs.
Testing High-Voltage Insulators in Service.
Distribution Transformer Standardization.
*Steel Poles.
Revision of General Order 64 in Cooperation with Advisory Committee.

Testing High-Voltage Insulators in Service.
Maintenance of High-Voltage Lines.
Distribution Transformer Standardization.
Bare Wire for Distribution.

Apparatus—C. E. Schnell, Chairman.

Relays and Relay Application.
Fire-Fighting Equipment.
Oil Circuit Breakers.
Transformers.
Station Electrical Grounds and Control of Grounds.
Power Interchange.
Automatic Generating Plants and Automatic Substations.
Frequency Changers.
Transformer Voltage Control.
*Power Plant Layout.

Relays and Relay Application.
Pacific Coast Practices in Transmission and Distribution Substations.
Additional Information on Station Grounds.
Oil Circuit Breakers.
Joint Review of Transformer Voltages.
Lightning Arresters.
Carrier-Current Telephone Communication.
High-tension Fuses.

Meter—G. H. Searle, Chairman.

Education of Metermen.
Meter Test Period.
Maintenance of Relays.
Effect of Wave Shape on Operation.
High-Tension Metering for Operating Purposes.
Use of Oil in Meter Bearings.
Cooperation with Safety Rules Committee.
Proper Size Meters for Various Installations.
New Developments:
Improvements in Watthour Meters.
Low-Cost High-Tension Current Transformer.
New G. E. Demand Contact Device.
Westinghouse O. B. Meter.
Synchronous Motors for Demand Meters.
Multi-Range Standard Instrument Transformers.

Proper Size Meters for Various Installations.
High-Tension Metering for Operating Purposes.
Meter Test Period.
Keep in Touch with Safety Rules Committee.
Education of Metermen.
Maintenance of Relays.
New Developments.

Prime Movers—C. E. Steinbeck, Chairman.

*Cooling Towers.
*Operating Code Definitions.
Heat Balance—Long Beach Steam Plant.
Boilers.
Refractories.

*Burning of Liquid and Gaseous Fuels.
Stand-by Plant Design.
Cooling Towers—Spray Ponds.
Condenser Leakage.
Station Auxiliaries—Modern Plants.
Heat Balance.

Safety Rules—W. H. Talhott, Chairman.

Contact with the California State Safety Orders.
Method of Installing Water Heaters and Cost of Installation, as Applied to the Code Requirements.

Study of Safety Orders and their Application.
Changes in the National Electric Safety Code.
Study of Safety Switches.
Grounding Problems and Requirements on Consumers' Installations.

*National Technical Section subjects.

Book Reviews

CONNECTING INDUCTION MOTORS

By A. M. DUDLEY, B. S. in Electrical Engineering (Michigan); Fellow, A.I.E.E.; Member Society of Automotive Engineers; Manager, Automotive Engineering Department, Westinghouse Electric & Manufacturing Company. Second Edition, 6 x 9 in., 361 pages, 289 figures. \$3. Published by McGraw-Hill Book Company, Inc., New York, N. Y.

Up to a comparatively few years ago the subject of induction motors had been treated almost wholly from the theoretical standpoint. The windings of this type of motor, as well as the practical details of construction, had very little published concerning them. A practical treatise such as this book on the winding characteristics of this important piece of electrical apparatus is most valuable.

In the second edition five new chapters have been added, and a few alterations have been made to the first edition. No radical changes have been made, however, as the author feels that the experience with the first edition indicates that the treatment is satisfactory for the purpose intended—to serve the practical man engaged in operating and repair work.

The book opens with chapters on the rotating magnetic field and types of windings, followed by chapters on rotor and single phase windings. Chorded windings, distribution factor, and the effect of changes in voltage, in the number of phases, in the frequency, and in the number of poles then are treated. Chapters follow on unusual or emergency conditions, reconnecting old windings for new conditions, and locating faults in induction motor windings. One of the most valuable chapters in the book then follows, covering methods of figuring a new winding for an old core. The important features of design are pointed out very clearly from a practical standpoint in the chapter. Methods of connecting to correct magnetic side pulls then are treated, and the book concludes with three chapters covering various winding diagrams.

The reputation of this book leaves little to be desired in describing its value as a book for repair men and operating men whose work has to do with induction motors. The various problems of winding and repairing of this important piece of electrical machinery are handled very thoroughly in the book, and no doubt it will be much in demand among men whose duties include the supervision of induction motors.

E. R.S.

California Electrical Bureau Issues New Edition of Appliance Information Booklet.—A new edition of the "Hand Book of Electrical Appliance Information" has been issued by the California Electrical Bureau. This edition is the same as the previous one (Journal of Electricity, July 15, 1925, p. 69), with the exception of the insertion of a table of operating costs that lists each appliance and gives the average cost per hour to operate it.

Meetings

Plans Under Way for Glenwood Springs Joint Convention

There are only four days in September, according to the calendar recently issued by the publicity committee promoting the annual joint convention of the Rocky Mountain Division, N.E.L.A., and the Colorado Public Service Association at Glenwood Springs. The four days specified are all in red ink and indicate that September will have the 14, 15, 16 and 17. These are the convention dates, and over 500 invitations and broadsides have been issued by the committee as the first gun in promoting a record attendance at the convention.

O. A. Weller, chairman of the program committee, reports a ready acceptance from speakers. The entertainment committee headed by John J. Cooper already has the social side under way while Ned Phinney, general convention chairman, is rounding the general plans into shape.

Members of the electrical and utility industry and ladies are invited to attend, according to Mr. Weller, who is secretary of both of the sponsoring organizations.

Civil Engineers Hold Summer Meeting at Salt Lake City

Although irrigation and land settlement were the chief subjects considered, some important engineering phases of power development were discussed at the summer meeting of the American Society of Civil Engineers held at Salt Lake City July 8-10. William Kelly, director of engineering, National Electric Light Association, and former chief engineer of the Federal Power Commission, in a paper entitled "Cooperation in Irrigation and Power Development" discussed the regulation of stream flow on some of the principal Western rivers to meet the demands of irrigationists and power interests.

He reviewed specific cases which have been brought to the attention of the Federal Power Commission, pointing out the difficulties which have been involved and the solutions which have been reached. Among the examples which he cited were the Deschutes River in Oregon, the Columbia, Sacramento, San Joaquin, Kings, Green, Trinity, and American Rivers. All of the cases he mentioned have been reported in the proceedings of the commission or have been the subject of special investigations and reports.

"Interstate Water Problems and Their Solution" was the subject of two papers, one presented by M. C. Hinderlider, state engineer, Colorado, and the other by Frank C. Emerson, state engineer, Wyoming. Mr. Hinderlider presented the side of the question favoring the Colorado River Compact plan and reviewed the history of the Compact idea and offered much data on recent interstate decisions and interstate legislation.

Mr. Emerson disagreed with this view, urging that interstate water rights should be settled by conference.

He urged that every effort be made to avoid methods of settlement of interstate questions that may call for litigation or adjudication.

The principal paper before the Power Division dealt with "The Relation of Stream Regulation to Irrigation and Power Development" and was presented by J. C. Stevens, consulting hydraulic engineer, Portland. In this paper and in the discussion which followed, it was held that in the arid West the irrigator should have first claim to the water supply in preference to power. It was brought out that power will benefit in the long run by conceding to such preferential use. Complete regulation of the water supply of the arid West for irrigation will require the storage of 40 per cent of the annual

COMING EVENTS

California Electragists, Northern Division—
Annual Convention—Eureka Inn, Eureka
Aug. 6-8, 1925

Pacific Radio Exposition—
Third Annual—San Francisco, Calif.
Aug. 22-28, 1925

National Radio Exhibition—
Third Annual—Los Angeles, Calif.
Sept. 5-12, 1925

Camp Cooperation V—
Conference of representatives of local
electrical leagues—Association Island
Henderson Harbor, N. Y.
Sept. 8-12, 1925

Rocky Mountain Geographic Division, N.E.L.A.—
Annual Meeting—Glenwood Springs, Colo.
Sept. 14-17, 1925

American Institute of Electrical Engineers—
Pacific Coast Convention—Seattle, Wash.
Sept. 15-17, 1925

low water yield, the paper set forth. Were the water supply so regulated, Mr. Stevens pointed out, power use could be made of about 60 per cent of that supply without interfering with irrigation. Water is indispensable for irrigation but not for power, he stated. The development of waters not available for irrigation and the interconnection of power systems will tend to minimize the irrigator's demands upon water used for power development.

Eureka Meeting of Electragists to Be Attended by Many

So many reservations have been received for the annual convention of the Northern Division of the California Electragists to be held in Eureka Aug. 6-8 that it will be impossible to accommodate all those planning to attend at the Eureka Inn. The overflow will be taken care of at the Hotel Vance. The committee in charge of the convention has been very gratified by the cooperation they have received from men who have given up their reservations at the Eureka Inn and will go to the Hotel Vance so that all women attending the convention may be housed at the Inn.

The program which has been arranged includes the executive committee meeting Thursday morning and the general open meeting Thursday afternoon, while an auto tour up the coast has been arranged for the ladies during this time. Friday will be spent in the logging woods and the electric mills and an informal ball will be held Friday night.

Power Companies' Sales Program Explained At Joint Meeting

The sales program of the Pacific Gas and Electric Company and the Great Western Power Company, including details regarding the kitchen lighting, range, water heater, and air heater campaigns of both companies, was the subject discussed at a joint meeting of the Tri-County Electrical Development League, the Marin County Electrical Development League and the Sonoma County Electrical Development League that was held recently at Feters Springs in Sonoma County. Earl Wilson of the Tri-County League presided over the meeting. Greetings from the other leagues were extended by T. W. West, vice-president of the Marin County League, and Tully N. Cornick, president of the Sonoma League.

Capt. G. B. Baldwin, of the Pacific Gas and Electric Company, spoke on the value of organization and stated that cooperation is successful if based on the cornerstone of confidence. He said the sales program of the two public utilities would take care of the two greatest obstacles facing contractor-dealers, namely, lack of capital to finance time payments, and costs for range installations, both without loss to the contractors.

E. F. Perkins explained the kitchen lighting campaign of the Pacific Gas and Electric Company and its lamp sales campaign. He also explained the details of the range, water heater, and air heater campaign of both companies.

R. T. Stephens, electric sales manager of the Pacific Gas and Electric Company, summed up the highlights of the sales program, presenting figures which gave some idea of the immensity of the value of the merchandise and wiring involved. He stated that the company salesmen would receive their commission, regardless of whether the sales were made through a contractor or dealer, and that they gladly would work with the contractor and dealer in making sales.

J. W. Wrenn, range sales manager of the Great Western Power Company, stated that the range, water heater and air heater sales program of his company was identical with that of the Pacific Gas and Electric Company. He urged every one in the industry to equip his own home electrically and stated that was one of the strongest arguments which could be presented by any salesman.

Questions of those present were discussed by the speakers, following the presentation of the details. The meeting was attended by approximately seventy-five.

Red Seal Plan and Power Sales Program Explained to League

At a recent meeting of the Contra Costa County Electrical Development League at Martinez, Calif., Clyde L. Chamblin of San Francisco, a member of the Board of Directors of the Society for Electrical Development, explained the Red Seal Plan of adequate wiring as it will be executed by the California Electrical Bureau and the California Electragists.

The sales program of the Pacific Gas and Electric Company and the Great Western Power Company also was explained in detail by representatives of these companies.

Personals

John B. Miller, president of the Southern California Edison Company, and chairman of the board, with headquarters in Los Angeles, has added to his numerous duties the additional ones of a vice-president of the National Electric Light Association, a position to which he was elected at that organiza-



JOHN B. MILLER

tion's recent convention in San Francisco. Born in Port Huron, Mich., in 1869, and educated at Ann Arbor High School and the University of Michigan, Mr. Miller went to California in 1896. Five years later when the West Side Lighting Company and the Redlands Electric Light & Power Company were merged to form the Edison Electric Company, he became president of the organization. In 1909 the company was reincorporated as the Southern California Edison Company, and Mr. Miller was elected president; nine years after he was made chairman of the board. Under his leadership the company has shown a steady and substantial growth and has taken its place in the front ranks of the utilities of the West. Mr. Miller always has taken a prominent part in the activities of the electrical industry; in particular he served with distinction as chairman of the convention committee of the N.E.L.A. in 1920. Outside of his electrical interests, he has numerous affiliations in the commercial field and is an officer and director in many large companies.

Frank J. Kiefer, formerly field representative of the California Electrical Bureau, recently has become factory superintendent for the White Pine Products Company of Alameda, Calif.

L. E. Belford, representative of Fairbanks-Morse & Company, in the Escondido and San Diego inland districts, now includes Arizona in his itinerary.

C. B. Hawley, president of the Rocky Mountain Electric Cooperative League, Salt Lake City, returned recently from the East where he attended several conventions.

S. B. Gregory, Western manager of the Arrow Electric Company, Hartford, Conn., recently left San Francisco to visit the Hartford office of his concern.

H. A. Rands, formerly construction engineer for the Portland Electric Power Company, Portland, Ore., recently accepted an engineering position with the Hammon Consolidated Gold Fields, Nome, Alaska.

E. A. Scott of Scott Bros. Electric Company and **Dean D. Clark** of the Mountain States Telephone & Telegraph Company recently were re-elected secretary and treasurer, respectively, of the Electrical Cooperative League of Denver.

E. E. Hill, superintendent electric meter department, New York Edison Company, stopped in San Diego for a chat with **W. H. Talbott** on his way to the N.E.L.A. convention.

R. H. Blanken, vice-president, Airfan Radio Corporation, recently described to the San Diego Electric Club the plans now being carried out to erect a 500-watt radio broadcasting station in that city on the roof of a leading hotel. The new station, to be known as KFWW, is to go on the air, Mr. Blanken stated, about Oct. 1.

A. H. Meyer has been appointed general manager of sales for **Leo J. Meyberg Company**, with headquarters in Los Angeles; **J. W. Thompson** has been made sales manager for northern California and **L. J. Tappan** assistant sales manager, both with headquarters in San Francisco. These changes were made following the recent death of **Sheldon N. Petersen**.

R. V. Jones, formerly director of sales of the Hoover Company, Canton, Ohio, has been appointed director of sales for the Hydro-Electric Manufacturing Company, Milwaukee, Wis.

L. W. Ross, transmission engineer Pacific Telephone & Telegraph Company, Portland, Ore., and chairman of the local section of the American Institute of Electrical Engineers, recently returned from the East where he attended the convention of the A.I.E.E. at Saratoga Springs, N. Y.

S. Z. Mitchell, president of the Electric Bond & Share Company, New York, was a visitor in Salt Lake City recently. Mr. Mitchell had just completed an inspection trip over the Idaho property of the Utah Power & Light Company, and was on his way to his New York offices after attending the N.E.L.A. convention in San Francisco.

R. P. Waite, formerly with the Southern California Edison Company, Los Angeles, is now electrical engineer in charge of design for the Texas Power & Light Company, with headquarters at Dallas.

Thomas Hunt, Tacoma, Wash., has been awarded a scholarship in electrical engineering by the Westinghouse Electric & Manufacturing Company. He will go to Pittsburgh to take up work in the Westinghouse school of electrical engineering.

M. Sweyd, Pacific Coast agent for the Lionel Corporation of New York, has moved his offices to 788 Mission Street, San Francisco.

Clark H. Minor, formerly vice-president of the International General Electric Company, has been elected president of the company, succeeding **Anson W. Burchard**, who will continue as chairman of the board. **Loren Emery**, former assistant merchandising manager of the company, has been made general merchandising manager. **R. G. Henderson**, former manager, has been detailed for special promotion work.

F. O. Sievers, for sixteen years with the industrial sales department of the General Electric Company, San Francisco, has severed his connection with that organization and is now vice-president and manager of the Coney & Kuchel Electric Works of that city. The firm will specialize in industrial plant work.

H. D. Fearey has been placed in charge of the Portland, Ore. territory of the Square D Company, Detroit, Mich., succeeding **H. R. Drew**, who has resigned his position with that company.

M. Luckiesh, director, Lighting Research Laboratory, National Lamp Works of General Electric Company, Cleveland, recently has been elected president of the Illuminating Engineering Society.

F. G. Fullman, sales manager, Steel City Electric Company, Pittsburgh, Pa., has resigned his position. **J. R. Richards**, recently connected with the credit department, succeeds Mr. Fullman.

A. C. Cornell, manager of the Western Electric Company in Denver, has been elected chairman of the Electrical Cooperative League of that city for the coming year. He is well known in electrical and utility circles of the Rocky Mountain region and is one of the founders of the Denver league. Mr. Cornell is a native of Rochester, N. Y., but he received his elementary education in the New York City Schools and later attended New York University and Washington University in St. Louis, Mo. It was in the latter city that he joined the Western Electric Company, with which he will have been associated twenty years next October. He was transferred to Denver as sales manager of the company in August, 1917, and on July 1, 1921, he was named manager of the Rocky Mountain district. He has served as treasurer of the Rocky Mountain division, N.E.L.A., for a number of years and has been a member



A. C. CORNELL

of the Rocky Mountain Committee on Public Utility Information since its formation in 1922. He is a member of the A.I.E.E. and the Society for Electrical Development and of various clubs in Denver, including the Rotary, Denver Athletic Club, Lakewood Country Club, Mt. Vernon Country Club, Denver Motor Club, Denver Press Club, and he is vice-president of the Park Hill Heights Improvement Association. Mr. Cornell has been a representative of the jobbers' division on the advisory board of the Electrical Cooperative League since its organization in 1921.

F. B. Schuyler and J. F. Russell, president and production manager, respectively, of the Johnson Washer Company, Oakland, Calif., have returned recently from an extended trip East where they visited a number of factories.

W. H. Hodges, manager of advertising and publicity, and B. F. Braheney, general auditor, Byllesby Engineering & Management Corporation, and W. N. Clarke, general manager, Southern Colorado Power Company, Pueblo, Colo., were among the Byllesby visitors to San Diego following the N.E.L.A. convention.

H. F. Hartzell, of Maydwell & Hartzell, San Francisco, returned a short while ago from a two and a half months' trip to the East where he visited a number of factories and investigated business conditions.

J. E. Davidson, vice-president and general manager of the Nebraska Power Company, Omaha, who was elected president of the National Electric Light Association at its recent convention in San Francisco, is a veteran of the electrical industry. The son of Wilbur F. Davidson, one of the pioneers in the field, Mr. Davidson has been acquainted with power stations since he was ten years old. Beginning his career as oil wiper, coal heaver and meter reader at the power plant of Port Huron, Mich., he was made superintendent of the plant at the age of twenty. Six years later he became general manager of the Consolidated Lighting Company, Montpelier, Vt. In 1910 he went to Portland, Ore., to take the general managership of the Pacific Power & Light Company, becoming vice-president and general manager two years later. He left Portland in 1917 for Omaha to assume the duties of his present position. Mr. Davidson always has taken a keen interest in the affairs of the electrical industry and has served



J. E. DAVIDSON

as president of the Vermont Electrical Association, of the New England section of the N.E.L.A., and of the Northwest Electric Light and Power Association. As chairman of the Lighting Educational Committee of the N.E.L.A. he sponsored and directed the International Better Home Lighting Campaign and essay contest last year. In addition to his activities in the electrical field, Mr. Davidson finds time to be a director of the Chicago Great Western Railroad, the Live Stock National Bank, and the University of Omaha. He was born in Flint, Mich., in 1879.

D. L. Huntington, president, The Washington Water Power Company, Spokane, recently returned from the East.

Ray W. Turnbull, assistant Pacific Coast sales manager, Edison Electric Appliance Company, Portland, spent a few days in Spokane recently on general sales matters.

H. D. McKinney, manager of the Chicago sales office of the Driver-Harris Company of Harrison, N. J., has been elected second vice-president and general sales manager of that company.

J. H. Cunningham, of the Los Angeles division of the General Electric Company, at a recent meeting of the San Diego Electric Club described the features of the new Long Beach steam plant of the Southern California Edison Company.

George Rucker of the Holophane Company, San Francisco, was a visitor to San Diego recently, in connection with the street lighting installations being made there.

J. H. Briggs, of the bond department of H. M. Byllesby & Company, was a visitor to the Coast properties of the company recently.

W. S. Mason has been placed in charge of the new branch office of the Pacific States Electric Company in Phoenix, Ariz. Mr. Mason formerly covered the territory in and around Los Angeles.

Fred E. Staible, Jr., formerly head of the Wesco Supply Company, manufacturers' agent in Denver, has resigned to organize his own firm of Fred E. Staible, Inc., with headquarters and warehouse at 2356 Blake Street in that city.

L. S. Storrs, managing director of the American Electric Railway Association, was a visitor in Salt Lake City July 21 and 22. Mr. Storrs was the guest of local electric railway officials at a luncheon at the Alta Club on July 21 and spoke before the business men of Salt Lake City at the Chamber of Commerce at a luncheon July 22. He departed for California on July 22, with the intention of inspecting various urban and interurban systems in that state.

L. C. Williams, formerly of the Los Angeles Bureau of Power and Light, has been made manager of the newly opened district office of the Pacific Electric Manufacturing Company in that city.

E. A. White, Chicago, a member of the National Committee on the Relation of Electricity to Agriculture, has been making a trip along the Pacific Coast conferring with state committees connected with this work.

W. S. Greenfield, president, Allied Industries, Inc., San Francisco, attended the Rotary Club convention recently held in Cleveland, and also visited various important Eastern centers on matters of business in connection with his company.

R. A. Thompson, consulting engineer, formerly chief engineer Railroad Commissions of Texas and California and member engineering board, Interstate Commerce Commission, and H. G. Butler, consulting engineer, formerly assistant chief engineer Railroad Commission of California and power administrator for the State of California, have formed a partnership for the general practice of engineering, with offices at 216 Pine Street, San Francisco.

C. W. Koiner, city manager of Pasadena, Calif., has resigned that position effective July 1. After a short vacation he intends to establish offices in Los Angeles as a consulting electrical engineer. Mr. Koiner has been connected intimately with the electric light and power business since 1892, when he began work for The Laurel Electric Light, Power & Heat Company of Laurel, Md. In 1905 he went to St. Louis, Mo., as secretary-treasurer and engineer of the National Light & Improvement Company, a holding company controlling a number of gas and electric utilities throughout Kansas and Texas. Moving



C. W. KOINER

to California in 1908, Mr. Koiner became general manager and electrical engineer of the city of Pasadena's light and power department. His appointment in 1921 as first city manager of Pasadena was the logical culmination of his excellent record in the city's service.

D. D. Swanger, connected with the San Francisco office of the Edison Storage Battery Company for the past several years, has been transferred to the Los Angeles office of that company.

Maj. G. E. Edgerton, chief engineer of the Federal Power Commission, recently visited Utah where he made extensive hydroelectric investigations in the interests of the commission.

Obituary

Roy Edward Shawlin, for the past six years affiliated with the Russell & Stoll Company, New York, died on June 26 at the age of forty. Starting as manager of the Chicago office, Mr. Shawlin served for two years in that capacity before removing to New York as sales manager, the position he occupied at the time of his death. Formerly, Mr. Shawlin was identified with the Westinghouse Lamp Company, with the business staff of the Electrical World and just previous to his connection with Russell & Stoll with the Franklin Lamp Company. He was a native of Ottawa, Ill.

John H. McIntosh, manager, Federated Industries of Washington, Seattle, recently died suddenly in that city.

TRADE NOTES

Adams Bros. Manufacturing Company, Inc., Pittsburgh, Pa., manufacturers of radiant gas heaters, announce the placing on the market of a white porcelain enamel electric wall heater especially designed for use in bathrooms. Construction is rugged and the heating element well protected and supported. The heaters are made for 110-120 volts.

The Birtman Electric Company, Chicago, makers of Bee-Vac cleaners, is offering a trip to Chicago with a week's entertainment to the Bee-Vac jobber's salesman making the most sales between June 1 and Aug. 1.

Marchant Calculating Machine Company, Oakland, Calif., recently has placed a new electrically driven automatic calculating machine on the market which, it is stated, effects a method of "short cut" that gives results in true figures, speeds up work and greatly reduces the amount of replacement and maintenance costs.

Mac Products Company, Erie, Pa., has introduced recently a new type of oscillating washing machine designed to eliminate complicated construction and to produce speed and efficiency in operation.

U. S. Electrical Manufacturing Company, Los Angeles, has developed recently the U. S. Auto-Start motor, which it is stated is an automatic self-starting squirrel-cage motor without any moving parts in the starting mechanism.

Circle F Manufacturing Company, Trenton, N. J., has announced the issuance of a new net price sheet, giving a detailed list of its products with prices and descriptions.

General Electric Company, Schenectady, N. Y., has issued recently a twelve-page descriptive bulletin entitled "The Voltage Drop Control System." The bulletin is well illustrated with photographs.

The Electrical Equipment & Manufacturing Company, Toledo, Ohio, has purchased recently the patent rights, dies and other equipment from the Michigan Stamping Company of Detroit, which formerly manufactured the Wolverine and B. G. line of outlet boxes, switch boxes and cabinets, and which featured the patented B. G. stud for use in outlet boxes. In addition to this the Electrical Equipment Company also has purchased the entire production for the next twelve months from the End-O-Let Company of Detroit, manufacturers of End-O-Lets, and has entered into a contract with that company to accept the selling agency on its fittings.

P. A. Geier Company, Cleveland, has announced its new Super-Royal Cleaner, Model "K," for which many advantages are claimed. Descriptive literature may be had by writing the company.

Russell Electric Company, Chicago, Ill., recently has placed three new lines of merchandise on the market, the Hold-Heat De Luxe curling iron, the Hold-Heat De Luxe combination hair dryer and curling iron and the Hold-Heat De Luxe heating pad.

The Esterline-Angus Company, Indianapolis, Ind., has issued recently Bulletin 425, featuring the new Esterline-Angus "Twin Type" graphic meter, in which it is claimed any two standard meter elements can be built, and either strip charts or daily charts can be used. It is said to occupy 30 per cent less switchboard space and gives two records accurately synchronized as to time.

Circle F Manufacturing Company, Trenton, N. J., has issued recently descriptive literature of a new product called the "Circle F shallow type switches." The merits of this new device are given fully in the booklet. In addition to this the company announces the manufacture of the new "Circle F" canopy switches, which are designed for use with shallow spun or cast canopies.

Crescent Washing Machine Company, New Rochelle, N. Y., has issued recently a new catalog describing its Crescent dishwashing machines. The booklet is illustrated profusely with photographs and drawings.

Chicago Fuse Manufacturing Company, New York, has announced the removal of its office and warehouse to 71 Murray Street, that city, where it will be better equipped to give service to its customers.

The Magnavox Company, Oakland, Calif., has announced the appointment of Munson-Rayner Corporation as exclusive distributors of Magnavox radio products for the Pacific Coast states, with offices at 86 Third Street, San Francisco, and 643 South Olive Street, Los Angeles.

Fulton Iron Works Company, St. Louis, Mo., has issued recently a bulletin of its Type "J" Fulton-Diesel engine. The bulletin is illustrated and contains a list of stations where these engines are installed.

Sangamo Electric Company, Springfield, Ill., has issued recently Bulletin No. 69 on Sangamo distant dials, which are used with watt-hour meters for duplicating at a convenient location the reading of the meter register, for totalizing the revolutions or strokes of engines, generators, or other machines, or for summing on a single dial the total registration of a group of watt-hour meters. The distant dials are made in two types for operation on direct and alternating current.

General Electric Company, Schenectady, N. Y., has issued recently a new 27-page, paper-bound bulletin, No. 41,521-B, which is well illustrated and presents a complete line of motors, alternators and frequency changers adaptable for application on modern high-speed wood-working machines and those forms of machine tools requiring high-speed drive.

Link-Belt Company, Chicago, Indianapolis and Philadelphia, has placed in operation recently a new plan by which complete lines of silent chain drives of from one-quarter to ten horsepower, in practically any reduction from one to one to seven to one, are now available for immediate delivery, thereby eliminating delay and avoiding the made-to-order basis formerly employed.

Roller-Smith Company, New York, has issued recently two new bulletins covering its lines of apparatus. Bulletin No. 400 is descriptive of its direct-current switchboard instruments, including ammeters, milli-ammeters, voltmeters, milli-voltmeters and volt-ammeters. Bulletin No. 530 describes the new non-closable-on-overload circuit breaker.

Benjamin Electric Manufacturing Company, Chicago, Ill., has issued a new pamphlet describing its "Benco" weather-proof socket for heavy duty industrial use.

Fairbanks, Morse & Company, Chicago, has issued recently Bulletin H306, profusely illustrated and fully descriptive of its motors on metal-working machines.

The Magnavox Company, Oakland, Calif., recently has issued several new pamphlets descriptive of its portable electric heaters.



Who wouldn't envy this group? Reading from left to right they are: Harry Walker, vice-president, California Electragists; Glen E. Arbogast, Newbery Electric Corporation; Harry Harper, Western Electric Company, all from Los Angeles.

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES



The 220-kv Tie-Line from Pit River No. 3 Power House

THIS LINE connects with the main 204-mile transmission line of the Pit River project. The towers are of the standard designs adopted by the Pacific Gas and Electric Company for mountain conditions and used on all 220-kv lines. Standardization of transmission line towers permits material economies in transmission line costs, through the saving of engineering time and cost of steel and in the quicker delivery of towers which have already proven completely satisfactory.

All of the towers of the Pit River No. 3 tie-line and the main Pit River line were furnished by the Pacific Coast Steel Company and manufactured of Special Tower Steel.

PACIFIC COAST STEEL COMPANY

RIALTO BUILDING, SAN FRANCISCO

ROCKBESTOS

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May 18th, 1925.

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 New Haven, Conn.

Dear Sirs:

The Rockbestos Stove Wire, and the other products of your manufacture, which we are using, are certainly giving us the best of service and meet every test to which we put them, in a very satisfactory manner.

The very uniform quality of your products is certainly commendable.

Very truly yours,
 A. J. LINDEMANN & HOVERSON CO.
E. A. Rutenber
 Mgr. Electrical Division.

EAR-3

They use Rockbestos on their products. We consider this a great tribute from one manufacturer to another's product. Rockbestos gives satisfaction.

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Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

J. W. OTTERSON, Associate Editor
G. R. HENNINGER, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNBY, Managing Editor

R. N. PHELAN, Associate Editor
B. H. SNOW, Northwest Editor

VOLUME 55

SAN FRANCISCO, AUGUST 15, 1925

NUMBER 4

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Annual

Merchandising Number

ON Oct. 15 next the Journal of Electricity will publish its annual merchandising issue. For some years past the feature of this issue has been the directory entitled, "Where to Find It in the West," giving a list of manufacturers of electrical and industrial equipment, machinery and supplies, together with the names and addresses of their Western distributing outlets. The care with which this directory has been compiled, the comprehensiveness of its indexing has made it an invaluable service to the industry. This feature will be presented as usual fully corrected to date of issue.

Our readers are already familiar with the extraordinary impetus being given to appliance and supply sales in the Western territory due to the addition of more than 250,000 kw. to the installed capacity of the central stations. The editors of the Journal now are conducting a research and analysis of the situation in all of the eleven Western states in order to present in its entirety the sales programs of all of the central stations in that territory. In volume, the total of new business thus being created is tremendous. Sales are being discussed in terms of many thousands of each type of current-consuming device.

Our advertisers will find in this issue a golden opportunity to tell their story to nearly 6,000 readers, all actively participating in this great movement.

McGraw-Hill Company of California — 883 Mission St. — SAN FRANCISCO

Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

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WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

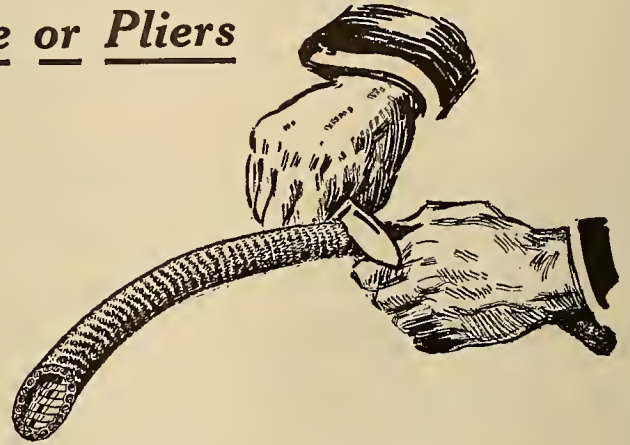
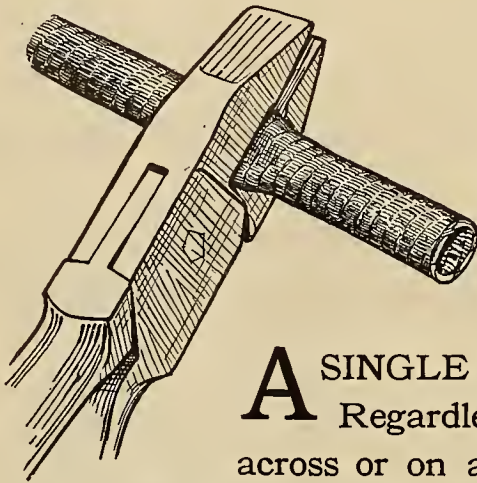
Printed in U. S. A.

McGraw-Hill Co., Inc., New York
Publishers of

American Machinist—European Edition
(Published in London)
Industrial Engineer (Published in Chicago)
Electrical Merchandising
Chemical and Metallurgical Engineering
American Machinist Ingenieria Internacional
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The clean edges of DURADUCT are due entirely to the Single Wall. In this construction every thread is locked in place. It is impossible for the end to ravel or fray out.

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EDITORIAL

A Good Job Well Done

IN this issue will be found the story of the development of Pit Three, the latest addition to the hydroelectric power development of the Pacific Gas and Electric Company. It marks another milestone along the road to electrical supremacy, the goal toward which the electrical industry in the West is striving.

As to the job itself, from its inception to its completion, too much cannot be said in praise of the great group of men responsible for the happy consummation that marked the dedicatory exercises on July 18 last. A work that called for the expenditure of some \$13,500,000 within two years time is a large contract, even in these days of great undertakings and big figures. Nevertheless, it was completed within schedule time and within the original estimates of cost, the work having been handled almost entirely by the engineering and construction staff of the Pacific Gas and Electric Company.

This closely approximates the ideal of a self-contained organization, blessed with a staff of competent men thoroughly capable of designing, constructing and operating anything that those in authority may choose to undertake. Those who contribute to the success of the enterprise through their specialized articles of manufacture, be it apparatus or supplies, are participants in the credit that attaches to all concerned for a good job well done.

Which is the greater, the creator or the creation? There can be but one answer, and when those who have so successfully harnessed the waste forces of nature and converted them to the useful service of mankind pass on to their final reward, there will be left behind a monument to their greatness at which succeeding generations will never cease to marvel.

Cooperation and Organization Will Market California's Power Crop

ELECTRICAL history is being made quickly these days in California. The actuating force behind the present drive lies in the fact that some 250,000 kw. of additional installed capacity will come on the interconnected system of that state within this half of 1925. For this a market must be created, a task of no small magnitude that requires intelligent direction and co-ordination of all the forces at the command of the entire electrical industry.

Of the plans made by individual central stations due mention has been made in the news columns of the Journal of Electricity. These, however, cover but one branch of the industry. The other equally important branches, the manufacturers of apparatus,

appliances and supplies, the jobbers who handle the distribution, and the contractors who undertake the responsibility of installation are preparing to join forces in order to take due advantage of this condition and extend the blessings of electrical service wherever the distribution systems of the central stations make such service possible.

Fortunately, the electrical industry in California is well organized—better organized than at any time in its history—and organization is the keynote of success. There is, of course, the Pacific Coast Electrical Association, primarily a central station organization, through whose studies and researches material of great value, both commercially and technically, is produced for the benefit and guidance of the entire industry. The Pacific Coast Jobbers Association always has been an efficient organization, alive to market conditions and trade extension. Then we have now in California for the first time a state-wide organization of contractors as a branch of the Electragists International with a membership of more than 400, the largest of any state in the country. The term "Electragist" is in itself a distinction that cannot be enjoyed by the unworthy or the incompetent for it is copyrighted, and certain standards of conduct must be observed by all those who hear this title.

In the California Electrical Bureau is the state-wide cooperative organization for sales promotion. Its advisory board is both representative and inclusive, embracing as it does every branch of the industry. Through the Bureau the sales promotion work is co-ordinated so that each branch of the industry may be benefited by taking due advantage of existing conditions.

A great opportunity is knocking at the door of the electrical industry in California; the industry knows it, and is organized, ready to meet it with extended hand.

Power Bureau Earnings and the Los Angeles City Hall

REPORTS current to the effect that the Los Angeles Bureau of Power and Light had donated \$1,200,000 out of its "earnings" to be applied to the purchase of land for a new city hall for the southern California metropolis have created more than passing interest in electrical circles. That interest produced a pardonable curiosity on the part of investigators, who, not satisfied with the mere statement that so great a commercial achievement had been brought about, began to dismember the woodpile in the belief that sooner or later an Ethiopian would be forthcoming.

Behold the dusky aborigine! It seems that during the year following the voting of bonds for the purchase of Southern California Edison Company's distribution lines in the city the Bureau of Power and Light collected from the taxpayers the sum of \$1,200,000 for the purpose of meeting interest and sinking fund charges on the \$13,500,000 bond issue that had been voted.

The legality of the sale was contested, and the case remained before the courts for three years, during which time the system continued to be operated by the Edison Company for the city, and interest and sinking fund charges were paid out of earnings. All this time the \$1,200,000 was accumulating dust in the city treasury. It could not be used legally by the city except for the purpose for which the money was levied unless a special vote of the people authorized a change. This then is the story of the "earnings" of the Bureau of Power and Light donated to the city for the city hall project.

Rural Electric Service in Ontario

WITH rural electrification one of the most important questions before the industry today, the alleged extent to which the farmer has been supplied with service in Canada, particularly in Ontario, becomes a subject of interest. Were the American farmer forced to pay as dearly for this service as his Canadian brother, then there is little likelihood that he would be at all interested in lightening his farm work with the aid of electricity. A study of the rates paid in both Ontario and in California by the farmer for comparable service shows an enormous difference in favor of the rates of California's privately operated utilities. For limited service—lighting, a few appliances and a small motor—the Canadian farmer's bill would average \$82.42 a year. For the same service the California farmer would pay \$36 annually. For a larger degree of service the Canadian farmer would be charged \$104.74 and the California farmer \$48.60.

But this difference in rates is only part of the story. The following extract is from the annual report of the Ontario Hydro-Electric Power Commission for 1925, giving a part of an amendment to the Rural Hydro-Electric Distribution Act of 1921:

"Where power is supplied to a rural power district under the provisions of the Power Commission Act and amendments thereto, there may be paid to the municipality or commission distributing the power upon the recommendation of The Hydro-Electric Power Commission of Ontario and the order of the Lieutenant-Governor in Council, a sum not exceeding fifty per centum of the capital cost of constructing and erecting in the rural power district primary transmission lines and cables, service transformers and meters, and secondary lines on the highway required for the delivery of power in such rural district."

Moreover, these payments are made retroactive

so as to take in all rural lines that have been constructed since the formation of the Commission.

Even with this government subsidy rural rates in Ontario are exorbitant, although power generated at Niagara has been classed as the cheapest in the world. Here is a story that the electrical industry can well afford to tell the farmers, whether they are now receiving electrical service or whether they are seeking it as is the case in many sections of the country.

Sell Refrigeration First, the Machine Afterward

AT the second session of the Commercial Section at the N.E.L.A. Convention in San Francisco domestic electric refrigeration held the center of the stage. Nearly the whole session was devoted to a presentation of an admirable report covering many phases of the subject, and to a discussion of this report by a number of enthusiastic commercial men present. Among the interesting material appearing in the record of proceedings of that meeting were two significant statements: the first, in the report, stating that there are now a little short of 67,000 machines in service; and the second, in the discussion, that there would be 10,000,000 sold in the next ten years. Balancing the prophecy of the one against the statement of fact of the other, one cannot help but marvel at the possibilities presented by this comparatively untouched field to benefit the entire electrical industry.

There is little doubt that domestic electric refrigeration is altogether feasible from an electrical, mechanical and economic standpoint, and that it promises to revolutionize the process of preservation of food in the home to the distinct advantage of the user. From the central station standpoint, considering load factor and diversity factor, it is not now possible to conceive of a better load with which to saturate the lines. With these thoughts in mind one easily visualizes the fulfillment of the prophecy expressed above.

The qualification of the prophet himself, however, is worth considering. He said, "The speed with which this market will be developed depends largely on how much support the refrigeration industry receives during the pioneering period," and this we would amplify to include "the kind of support." That period of time devoted to introducing a new device is of course a slow and tedious one compared with that later period during which the device, being well established in the public mind, practically sells itself. Let everyone realize that the big job during the pioneering period is to sell electric refrigeration to the public. While each manufacturer and each sales agency is scrambling for commercial supremacy, let him realize that he must sell electric refrigeration first and his particular machine afterward. Let there be nothing in his advertising or sales work that will tend to throw the shadow of doubt on the feasibility of electric refrigeration generally, since such action would react to the detriment of the whole industry.

Refuting the Charge that Utilities Are Making "Enormous Profits"

THE "enormous profits" credited to electric light and power companies by those who would see the ownership and operation of these utilities taken over by governmental bureaus would be considered niggardly in any other form of private business. Despite the assurance that these profits are regulated by law, the public has been wont to listen to the propaganda of politicians and others to the effect that the "power trust" is reaping a rich harvest at the expense of the people.

The utter truthlessness of such statements is brought out in a study of the operations of the twelve largest utilities in California made by the California State Railroad Commission at the request of the Department of Commerce. On another page of this issue is an item reporting the results of this study, together with other data compiled by the Journal of Electricity from the annual reports of the electric utilities in question. This shows that the approximate rate base of the companies which are doing 97 per cent of the electric business in the state in 1924 was \$441,358,000. During that year the gross income from electric operations of these same companies was \$80,115,257, the operating expenses \$49,204,178, leaving a net return available for interest, sinking funds, dividends and surplus of \$30,911,079. Thus the return on the approximate rate base for that year was 7.01 per cent. The report shows that on a similar basis, the return for 1923 was 8.61 per cent and for 1922, 8.89 per cent. Thus not only are the profits low, but they show a decided decrease for the three-year period.

In the face of such convincing figures as these it is difficult to understand how Governor Gifford Pinchot of Pennsylvania and others can make the statements which they do regarding the operations of the country's electric light and power companies. On the basis of the present rate of earnings there will be few fortunes made in the electric light and power business.

Another Political Body Seeks the Limelight

REPORTS have come from Washington that another august governmental body is ready and willing to consider the matter of the contract entered into between the City of San Francisco and the Pacific Gas and Electric Company for the disposal of power from the Moccasin plant of the Hetch Hetchy development. The legality of the agreement is purely a matter for the Interior Department to consider and pass upon. However, the Senate Public Lands Committee, which is to meet in San Francisco this fall, has announced its readiness to hear arguments on the contract, voicing as its right to do so the fact that it is interested in all uses to which the government's lands are put. In this instance it would appear that the committee seeks little more than an opportunity to bask in the limelight of political publicity which certain members of the fourth estate are giving to the Hetch Hetchy project at the present time.

DISCUSSION

Believes Article on Cost of Energy Merits Study by Engineers

To the Editor:

Sir—I wish through your journal publicly to congratulate Lester S. Ready, chief engineer of the Railroad Commission of the State of California, for his article "Factors Entering into the Cost of Electrical Energy" which appeared in your issue of July 15, 1925.

From a wide experience in the field of electrical applications I know that articles of the type written by Mr. Ready are invaluable in producing a direct understanding of the problems of the electrical industry on the part of those who cannot be reached through purely technical language. As a matter of fact, any engineer can read with a great deal of profit Mr. Ready's article, which illumines by illustration a rather difficult subject to present even in technical language, and does it in such a manner that the business as well as the technical elements of the problem are splendidly exemplified.

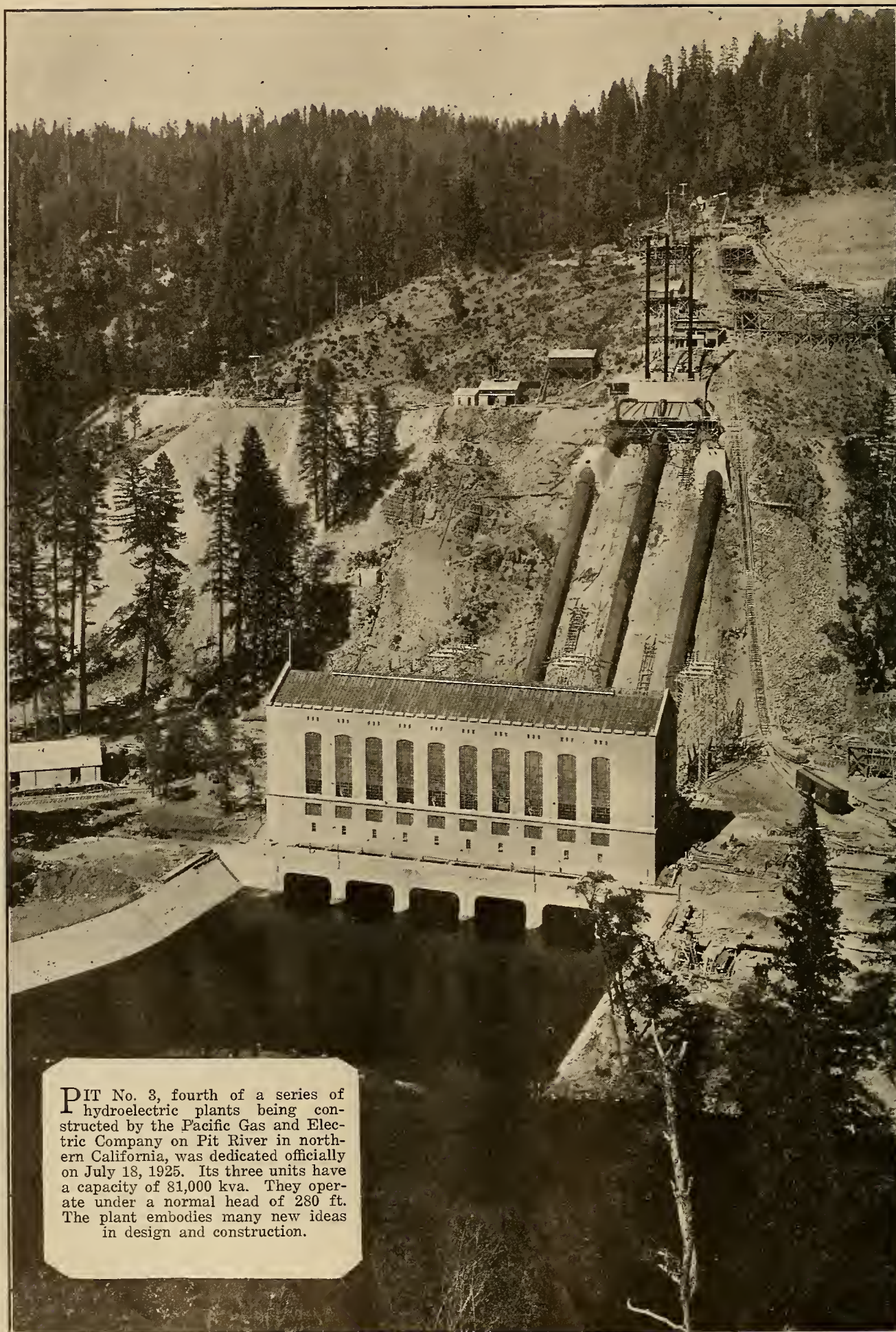
I would particularly wish to draw attention to Mr. Ready's statement, that from a strictly cost basis the lighting consumer should be charged a fixed sum per month, say 75 cents or \$1 plus a lower rate for energy consumed, and have noted his belief that such a rate probably would result ultimately in lower rates to the consumers and would make available to those who desire relatively low rates for additional service for other conveniences in the home. This suggestion, in addition to being sound and constructive from a rate standpoint, has also a strong psychological appeal in that it would result in a rate more nearly understandable to the average consumer than the one to which he is at present largely accustomed.

In water rates for the City of San Francisco an average bill of \$2 contains about 35 per cent as being a fixed charge for the maintenance of the consumer's meter and service, and the remainder of the cost being a charge for water actually consumed. The necessity for this is physically evident to any household consumer and it results to him in a lower rate per 1,000 cu.ft. of water, which more nearly satisfies his ideas of the justice of the situation.

From the power company's point of view it would seem also to have decided merit as it would without burdensome increase make the extremely small consumer pay a more just proportion of the total cost for service, and would enable the reduction of energy charges without reducing total income.

LOUIS F. LEUREY,
Electrical Engineer.

San Francisco, Calif.,
July 23, 1925.



PIT No. 3, fourth of a series of hydroelectric plants being constructed by the Pacific Gas and Electric Company on Pit River in northern California, was dedicated officially on July 18, 1925. Its three units have a capacity of 81,000 kva. They operate under a normal head of 280 ft. The plant embodies many new ideas in design and construction.

Pit River Hydraulic Development Involves Novel Features

By Walter Dreyer¹ and G. Ross Henninger²

NATURE kindly provides the necessary storage for the Pit River No. 3 development of the Pacific Gas and Electric Company in the form of vast areas of porous volcanic rock. Practically the entire geologic structure of this section of the country is of this type. Thus the waters from rains or from melting snows do not run off over the surface but drain vertically downward to the various water tables beneath the surface forming underground reservoirs. Springs fed from the underground reservoirs formed in the lava beds from the headwaters of this river. Similar springs add to the flow lower down the river course.

No appreciable storage is planned for any point on the system as all stations are designed primarily as stream-flow plants. What storage is provided by the various forebays will serve for purely emergency purposes and for carrying the peak loads. Such a plan of development is possible because of the peculiar character of the country which contributes to the Pit River an average flow characteristic of a normal variation of only about 15 per cent between average and minimum flow through the entire year. The basin of the Pit River is located in the four northeastern counties of California, Lassen, Modoc, Shasta and Siskiyou. The eastern (upper portion of this area is semi-arid and has little value as a source of power. The volcanic region in the western (lower) portion of the watershed, however, has a heavy precipitation.

A diversion dam on the Fall River and a 2-mile tunnel provide a static head of 454 ft. and an average flow of 1,218 sec. ft. for Pit No. 1 where this water enters the channel of the Pit River. The two Hat Creek plants No. 1 and No. 2 utilize the waters of a tributary to the Pit. For these plants static heads of 216.8 ft. and 201.3 ft. and average water flows of 332 sec.ft. and 503 sec.ft., respectively, were developed. Hat Creek flows into the Pit at a point just below the proposed site of Pit No. 2 where it is picked up by the Pit No. 3 reservoir.

One of the most interesting features from an engineering standpoint is the diversion dam which

THE geologic formation of the rock in the Pit River drainage basin is of such nature that storage is not required for the hydro plants of the Pacific Gas and Electric Company on that stream. However, this same formation presented difficulties in the selection of a dam site and the construction of the dam. In this article the authors discuss the various hydraulic features of the development.

forms a 9-mile lake of 32,500-acre-ft. capacity. It is a difficult matter to obtain suitable dam sites where the region is made up of an infinite number of lava flows which vary both in thickness and in composition. In general the prevailing rock formations are either basaltic or andesitic lavas, lava agglomerate, or tuff. These vary within themselves from solid rocks capable of withstanding almost any load to soft friable masses incapable of load. It is not uncommon to find

that what appears to be a solid rock point is in reality almost entirely soft material with only a capping or veneer of hard basalt or andesite. This characteristic of the topography makes the use of the diamond drill absolutely essential in investigating a proper dam site.

Three miles of river were explored carefully by means of the diamond drill, shafts and horizontal drifts. Consideration was given to eight different possible sites before the final location was selected. This final site in cross-section is shown on Fig. 1 and consists of four formations which lay in a nearly horizontal position, having a slight dip downstream. The upper formation is locally termed the "upper rocks." These are approximately 200 ft. thick and form the abutments for the dam. These upper rocks are underlaid by a thick stratum of firm dense impervious tuff which is termed the "upper tuff." Tests of small, laterally unsupported cubes of the tuff showed it to have an ultimate strength equivalent to from 50 to 75 tons per sq. ft., while that of the rock is well above these values. The maximum foundation pressures under the dam are about 8 tons per sq.ft.

Below this formation is another thick stratum of rock termed the "lower rocks" which in turn is underlaid by a second tuff formation termed the "lower tuff." The thickness of this latter stratum is unknown. The river had cut its way through the upper rocks and was running on the upper tuff. Therefore it was necessary to construct the dam on two general types of foundation. The center section is founded on tuff and the abutments are founded on the upper rock. Settlement joints are provided at the junctures of the two types of foundation so that no ruptures will result from unequal

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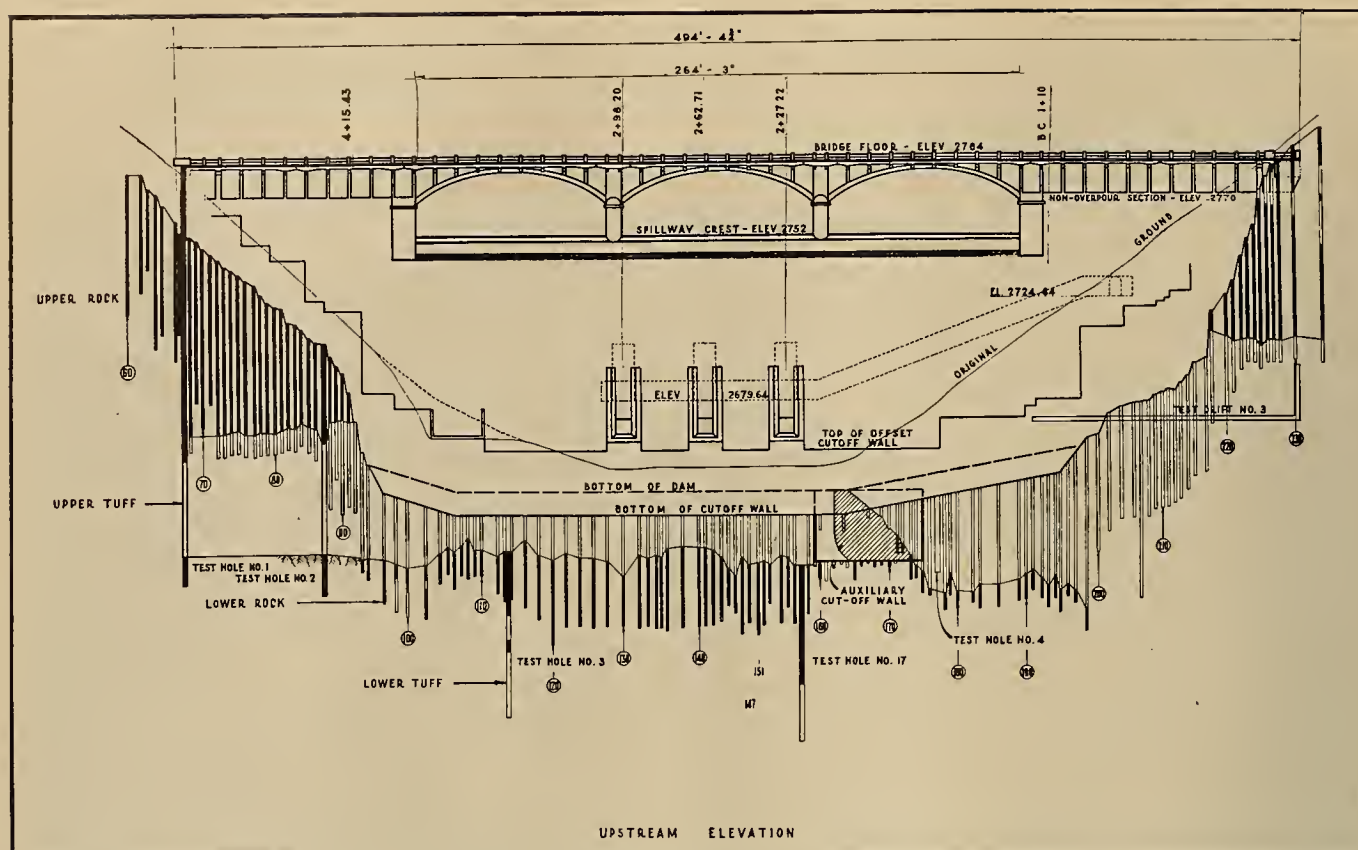


Fig. 1.—Cross-section of the dam site showing something of the geologic structure underlying the dam and showing grouting holes.

settlement. The dam (shown in Fig. 2) is of the ogee spillway type, arched in plan on a 500-ft. radius, and 112 ft. in height from foundation to the spill crest. The spillway portion is 267 ft. long and 18 ft. deep and is designed to pass a flood of 70,000 sec.ft. with the water level at the crest of the non-overflow section. The greatest recorded flood to date is 27,000 sec.ft.

A grouted cutoff wall consisting of a single row of holes spaced 3 ft. apart is provided under the usual cutoff wall at the heel of the dam. The cutoff wall was offset so that it projected 5 ft. upstream from the face of the dam in order to permit drilling and grouting operations to proceed simultaneously with the construction of the dam. Pipes were cast in this offset wall and the grouting holes were drilled through these pipes by means of a diamond drill. First, the primary holes of 24-ft. centers were drilled, tested for leakage and grouted. Next, the secondary holes halfway between the primary holes (12-ft. centers) were drilled, tested and grouted. This was followed by the first tertiary holes (6-ft. centers) and, where necessary, second tertiary holes (3-ft. centers). In this manner there was a progressive cementing up of the formation which could be checked by the results of the leakage tests. Leakage tests were made under a pressure equivalent to that imposed by the maximum water elevation of the reservoir and the grouting was done under a maximum pressure of 200 lb. per sq.in. Cement required for grouting averaged over one sack per lineal foot of hole.

A drainage system is provided for the foundation just downstream from the cutoff wall. A second line of drains in the form of "weep-holes" is provided through the apron at the toe of the dam and a third line just above the cutoff wall at the downstream end of the apron. Like the dam, the apron also was poured in sections so that any uplift pressures might quickly be relieved. The dam itself was designed with assumed uplift forces equivalent to full static head at the heel and reducing to zero at the toe with 50 per cent of the base area assumed as subject to uplift forces.

To permit lowering the water surface of the reservoir three sluice gates each with a 7 x 7-ft. clear opening were installed in the body of the dam. These gates are operated by high pressure oil from an operating chamber inside the dam. This gallery within the body of the dam also contains the necessary oil pumping and control equipment. Vents are provided to admit air just below the gate leaf.

A great deal of study was given to the problem of preventing erosion and scouring of the stream bed below the dam. The tuff formation resists erosion due to normal flow of the stream in an excellent manner, but it was deemed unsafe to discharge water over the ogee dam and onto the tuff without first destroying as much of the energy as possible. The use of a pool and the "hydraulic jump" seemed the most logical method, but could not be adopted at this site owing to the fact that to do so would require cutting through the impervious tuff to the more pervious "lower rocks." This was deemed inadvis-

able. Therefore baffle piers were constructed on the apron. Extensive tests were conducted on a model built to a 1/20 scale. Data from these tests greatly assisted in the final pier design and arrangement. It is interesting to know that the final arrangement differed materially from original ideas.

Spanning the spillway of the dam is a 3-span, open-spandrel, reinforced-concrete highway bridge. This structure replaces the older structure which was engulfed in the reservoir. Electric lighting standards and pleasing lines make this bridge an addition to the landscape as well as to travel facilities. Construction of a new portion of road to connect the bridge with the existing county highway also was necessary.

Tunnel Intake Structure

The reservoir is not used for storage and only the water contained in the top 8 ft. was considered necessary for regulating purposes. This figure was arrived at on the basis of permitting a shutdown of two days without wasting water. Thus weekly as well as daily regulation of the plant is provided for.

The tunnel intake is located 300 ft. upstream from the dam and is placed at the maximum elevation which will permit the required regulation. The structure (shown in Fig. 3) is quite large. Since the cost of the development is about \$40,000 per ft. of head developed, every effort has been taken to see that no unnecessary head loss occurs. The trash rack has an area of 2,500 sq.ft. so that the maximum

velocity through it is about 1.2 ft. per sec. The rack was designed to permit the installation of a rack rake at a later date should this feature be found necessary.

Below this rack the structure gradually reduces to the tunnel area where the maximum velocity is about 10½ ft. per sec. The shape and generous proportions of this structure should eliminate practically all entrance head losses. Two 8 x 18 ft., cast-iron, slide gates are installed at the entrance to the tunnel proper, these being provided purely for emergency use in the event that it is desired to drain the tunnel.

Tunnel

The tunnel is designed for a maximum flow of 3,000 sec.ft. It is of circular cross-section, 19 ft. in diameter, and is built on a grade of 3.1 per 1000. The tunnel grade was determined by the regulation elevation required at the intake and by the maximum surge elevation required at the lower end for acceleration. At Rock Creek the aqueduct emerges to daylight. This and the one adit driven for construction purposes provided six working headings.

The first section of the tunnel, from the headgates to the Rock Creek crossing, is 8,700 ft. long and the section from that point to the penstock manifold is 12,300 ft. Throughout the entire length of the tunnel with the exception of a very few hundred feet nothing more substantial than the aforementioned porous and partially decomposed volcanic rock was encountered. This meant that extensive timbering

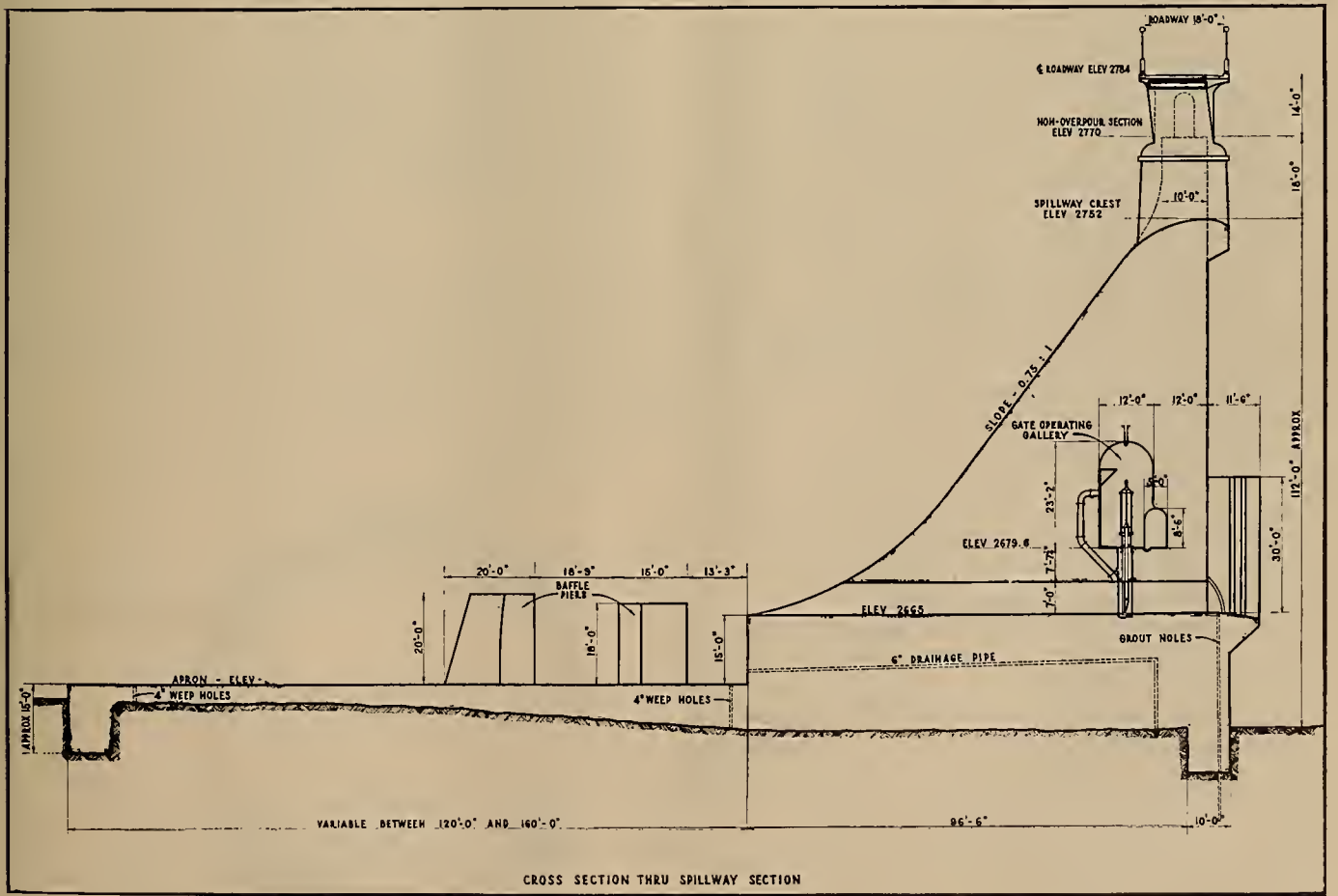


Fig. 2.—Cross-section of diversion dam showing arrangement of gate-operating gallery, apron, baffle piers and other features.

At Rock Creek a reinforced concrete pipe, 254 ft. long and with 14-in. walls provides a conduit of a size and shape exactly the duplicate of the tunnel proper and directly in the line of the tunnel. This conduit is carried across the space intervening between the tunnel portals on a reinforced concrete bridge. Further to conserve all available water for power purposes a small concrete diversion dam has been constructed across Rock Creek a short way above the crossing. This dam, incidentally, served as the model for the tests for the design of the diversion dam. From this point the water is carried down through a 24-in. pipe line and discharged into the main conduit. The capacity of this addition is 25 sec.ft.

Surge Chamber

The surge chamber as shown in Fig. 4 is located about 200 ft. upstream from the lower tunnel portal and was offset in plan about 140 ft. from the center of the tunnel in order to avoid interference with the driving and lining of the tunnel.

Operating requirements for the design of the surge tank were as follows:

(1) A uniform increase in flow from zero to 3,000 sec.ft. in three minutes for acceleration.

(2) An instantaneous rejection of 750 sec.ft. with a uniform retardation of the remaining 2,250 sec.ft. in two minutes for retardation.

(3) A maximum surge, on acceleration, of 60 ft. below the static level. This corresponds to 32 ft., or 10 per cent of the entire static head, below the normal level for full operation.

The surge chamber is of the simple type, 64 ft. in diameter at the bottom and having $\frac{1}{4}$ to 1 side slopes for a height of 60 ft. Above this is 94-ft. diameter cylindrical portion for the upper 27 ft. The best shape for hydraulic reasons would have been the frustum of a right cone rather than that of an inverted cone, but with the tank located entirely in excavation the form adopted greatly simplified construction as it was possible to pour the walls directly against the excavation without the use of lagging or back forms. The walls also were reinforced fully against hydrostatic pressure to avoid possible difficulties from cracking. A spillway is provided with the crest 3 ft. above the elevation of the overflow crest of the dam. This feature permits spilling the normal flow of the river over the diversion dam in the event of a long shutdown rather than spilling over the surge tank.

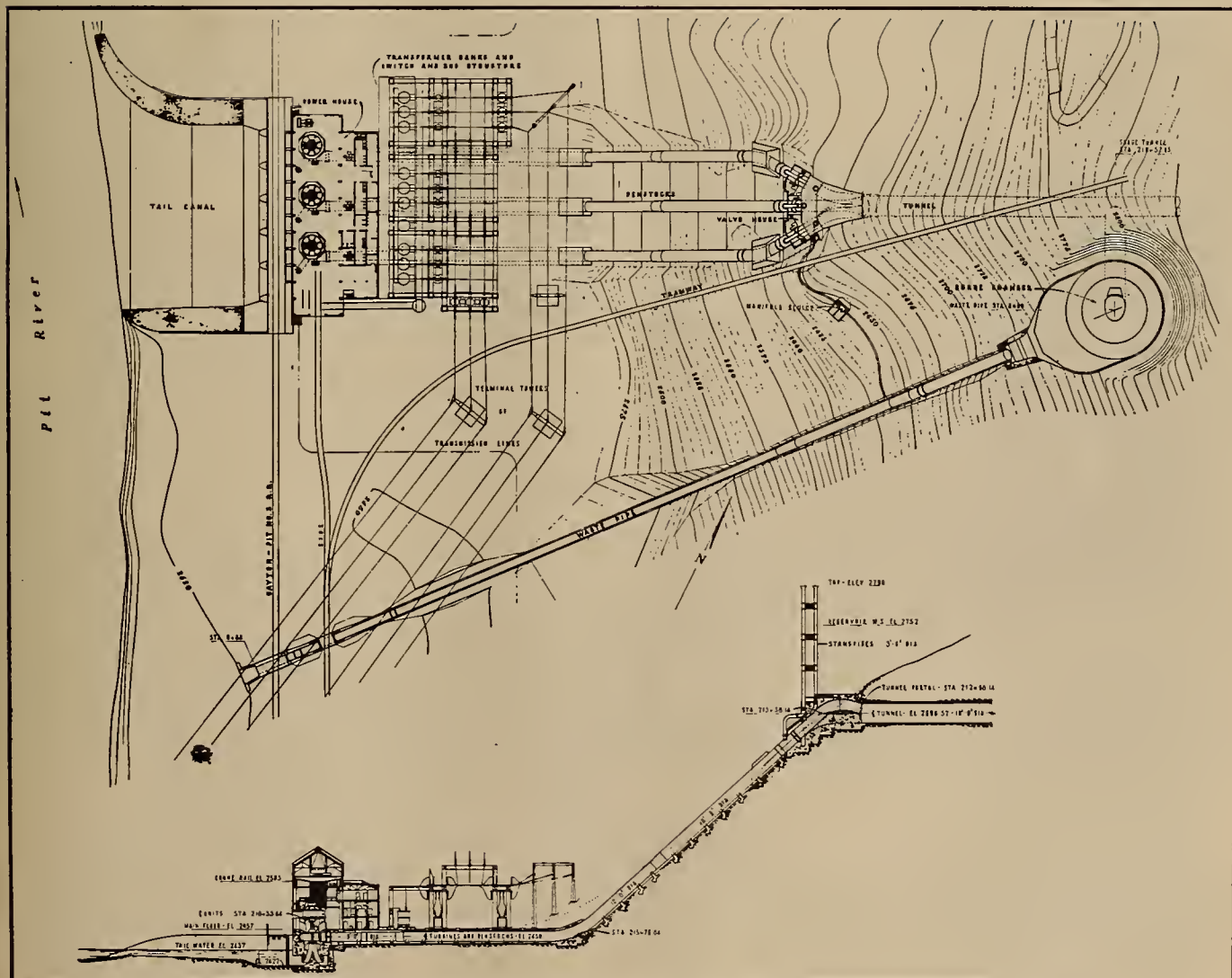


Fig. 5.—Plan and profile of power house, penstocks and surge chamber showing physical relations.

A spilling type tank was adopted for two reasons:

(1) Due to the fact that the tunnel is reinforced for practically its entire length any increase in head at the lower end would have increased greatly the cost of the tunnel and of itself would have been far more costly than the spillway and spill pipe. The design adopted effected a saving of about \$30,000 in cost over that possible with any non-spilling type.

(2) The number and amplitude of pressure changes are reduced.

Water spilling over the crest is carried through a pipe line varying from 10 ft. at the upper end to 7 ft. 3 in. at the lower end, and discharged into the river about 300 ft. upstream from the power house.

It is of interest to interject at this point the fact that Lumnite cement was used to a good advantage in the finishing of the Rock Creek crossing, the bridge over the dam, the surge chamber and other smaller finish-up jobs. As is well known, this cement gains ordinary 28-day strength in 24 hrs. Furthermore, the quality of job turned out with this variety of cement is in every way satisfactory and at least on a parallel with those wherein ordinary Portland cement is used. In spite of the fact that this cement is more costly than common cement, its use was warranted because of the saving of three or four weeks' carrying charges on the whole project.

Manifold

Three 10 ft. 9-in. riveted-steel penstocks are brought together at the tunnel portal in a manifold of unique design. The manifold really consists of the tunnel itself, its circular shape gradually being distorted into three depressions each of equal area. These depressions gradually change shape until they break into three separate circular sections. It is at this point that the steel penstocks enter, each to its corresponding concrete section. All of the cutting edges are steel bound to prevent erosion by water flow. The arrangement of three pipes at the point of entrance is such that lines connecting their centers would form an equilateral triangle resting upon its base. The two outer pipes are at the bottom and at once make a combined vertical and horizontal bend which carries them to the ground level and laterally to a point in line with the centers of their respective units. The third pipe describes only a vertical curve which brings it to the ground midway between the other two. These bends were made as sharp as possible to reduce to a minimum the size of the concrete block. A 24-in. pipe enters the tunnel immediately ahead of the penstock pipes for the purpose of sluicing out any debris which may enter the tunnel. The forming for this manifold was rather complicated, but the results should prove to be well worth the efforts. This design was arrived at in the effort to effect minimum head loss.

Penstocks

Butterfly valves 10 ft. 9 in. in diameter are installed immediately below the manifold, one in each penstock. These valves are housed in a concrete structure to protect the mechanisms from the weather. Each valve is arranged for remote operation from the power house switchboard in closing, but may be opened only by push-button control sta-

tions located at each valve. Mounted on the concrete manifold block are three 3-ft. standpipes, one of which is connected to each penstock pipe immediately below the butterfly valve. These three pipes are arranged in the form of a triangle and tied together by means of bracing trusses. This construction makes the whole unit self-supporting against wind loads.

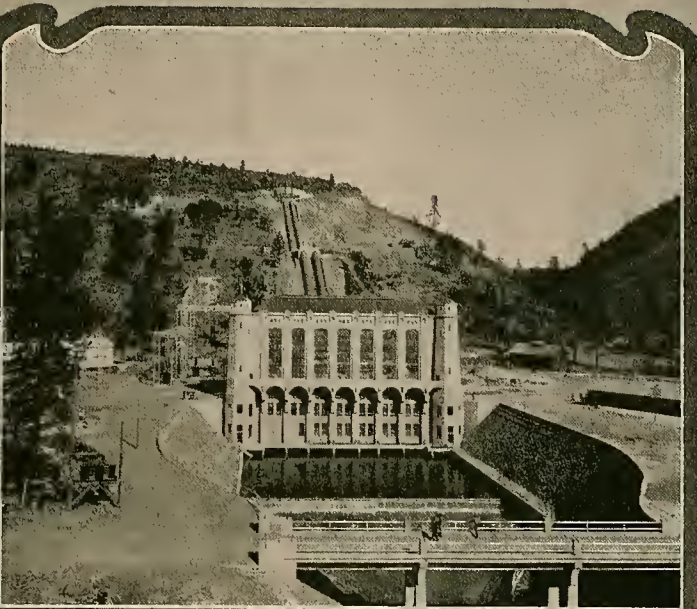
The three 10 ft. 9 in. triple-riveted butt-strap, steel pipes extend 240 ft. down the hill from the manifold entrance to a point where the diameter is reduced to 10 ft. Following a 270-ft. length of this size pipe the diameter is dropped to 9 ft. through a 7-ft. taper section. Thickness varies from 7/16 in. at the top to 3/4 in. at the turbine valve. At the final taper point water measurement is accomplished through an installation of Venturi meters which utilize the taper section to obtain pressure differences for the operation of the instruments. These taper sections are located in the tunnels where the penstocks enter the power house and hence afford a convenient location and means of securing pressure readings. Calibration of the Venturi meters was effected at the time that the acceptance tests on the turbines were run. These tests were made by the brine-velocity method. From the final taper section a 64-ft. length of penstock pipe extends to the turbines. This makes a total penstock length of 581 ft. including the length of pipe incorporated in the manifold.

Concrete piers support the penstocks slightly above the ground from the manifold down through the tunnels under the bus yard to the power house building. Johns-Manville service sheet packing is used to provide two graphited rubbing surfaces between the pipes and the piers. This reduces the coefficient of friction between the pipe and the piers permitting smaller piers and anchors. Expansion joints having copper-plated inserts are provided in each tangent section of each pipe. Heavy concrete anchors support each angle.

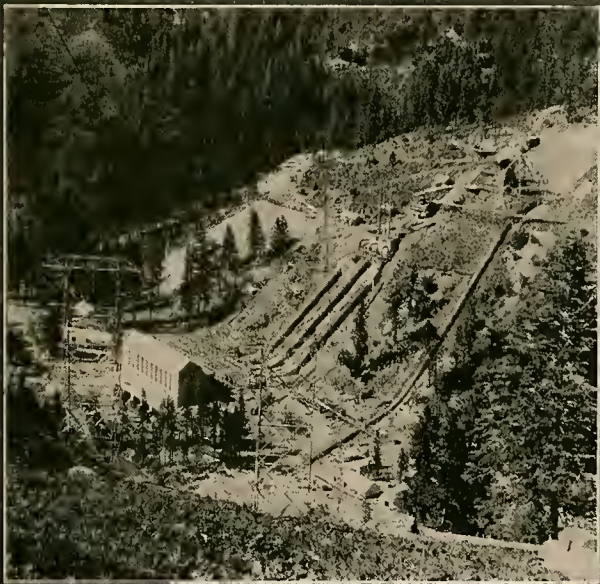
Methods of Rating Rivers to Be Standardized.—

A joint technical committee now is being organized to bring about national uniformity in the methods of rating the water power of rivers, according to an announcement by the American Engineering Standards Committee. At the present time a given water power development may be rated at 10,000, 20,000 or 40,000 hp. by different engineers, according to the point of view from which the work is done by the engineers. For example, the first figure might mean that the power is practically available all the time without provision of any storage basin. The second might mean that this power is available a certain percentage of the time. The last figure might indicate that under certain conditions, as for example if a storage reservoir is provided, the most effective use of the river flow will be achieved when this rate is reached. At the instance of the Geological Survey, the A.E.S.C. made an investigation of the situation and found that many different groups were interested in bringing about national uniformity in the rating of rivers, including light and power companies, financial groups interested in power development, consulting engineers and others.

Pit River Hydroelectric Development



PIT No 1



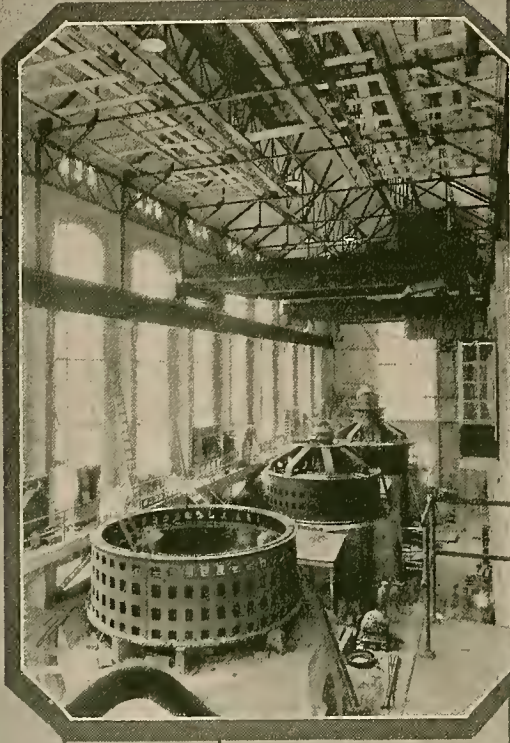
PIT No 3



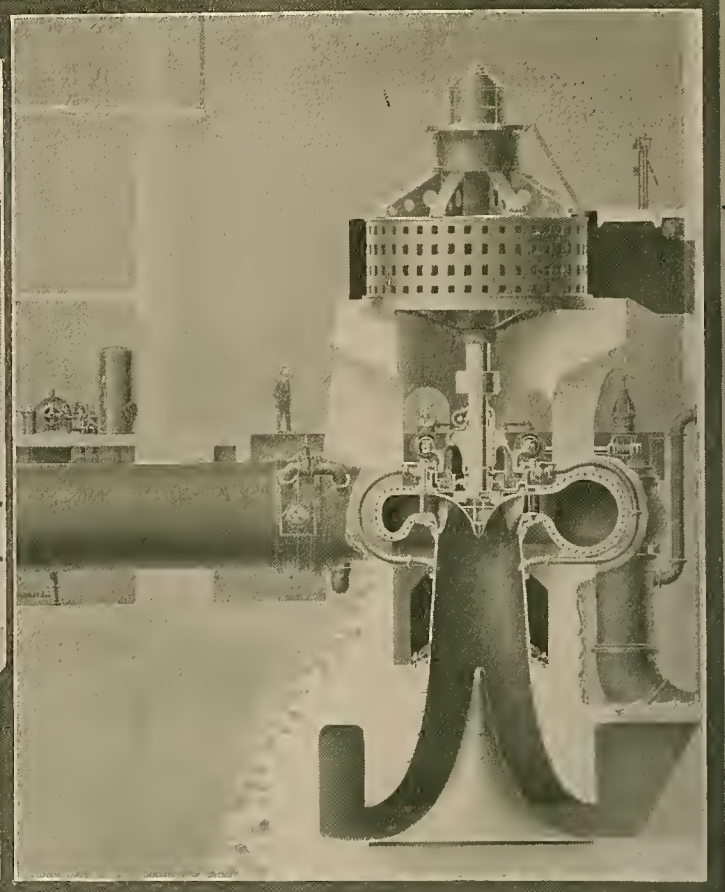
HAT CREEK No 2



HAT CREEK No 1



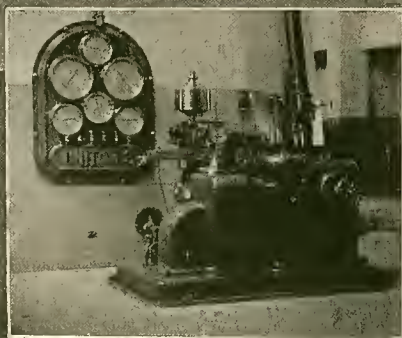
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THE three generators in Pit No. 3 plant during the course of construction are shown in No. 1. A cross-sectional view of the 33,000-hp. vertical reaction Pelton unit is shown in No. 2. Note the Moody spreading draft tube. The hydraulic units embody many new ideas. No. 3 shows the control room and benchboard. The operator stationed here has an outlook over the entire turbine floor as well as the outdoor switchyard. The gear-driven Pelton governor is shown in No. 4.

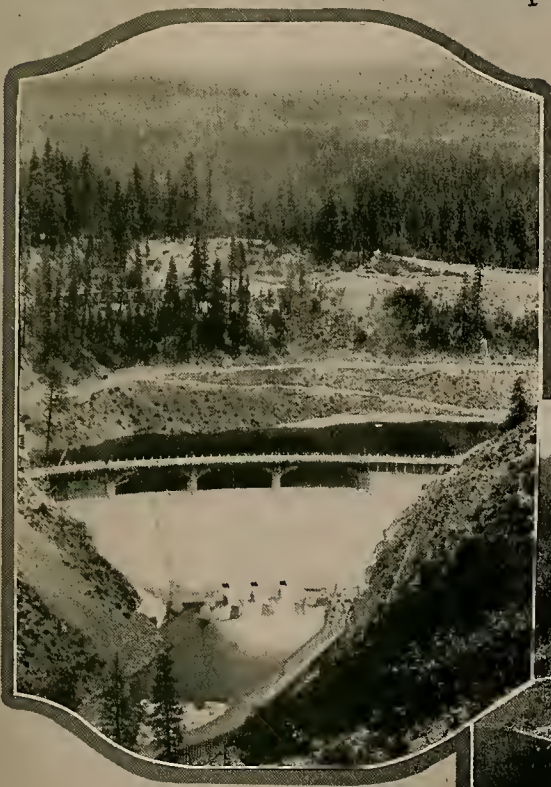


1

A section of the 4-mile tunnel, which is concrete-lined throughout its entire length, is shown in No. 1. The finished tunnel has a 19-ft. circular section. It was driven from six headings. No. 2 shows a section of the tunnel with reinforcing steel in place during the course of lining operations. No. 3 shows a view of the downstream face of the dam, which is 112 ft. in height from the foundation to the spillway crest. No. 4 shows an upstream view of the dam with a portion of the 9-mile lake, which has a capacity of 32,500 acre-ft.



2

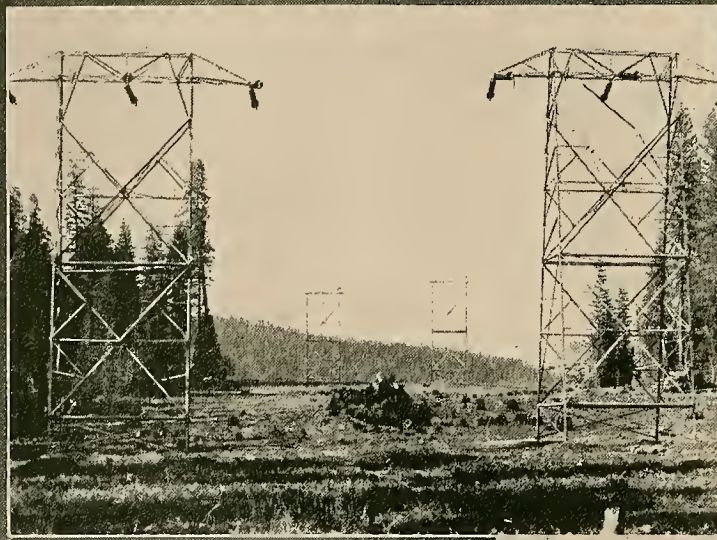


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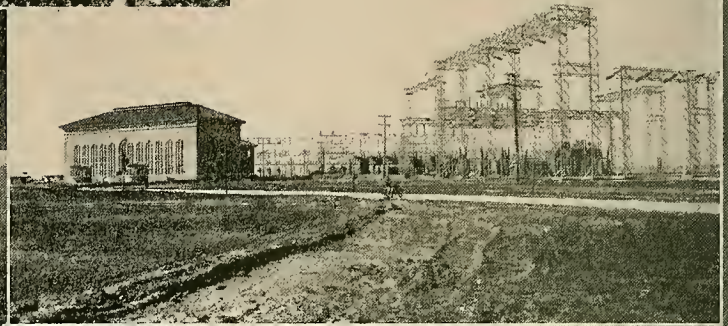
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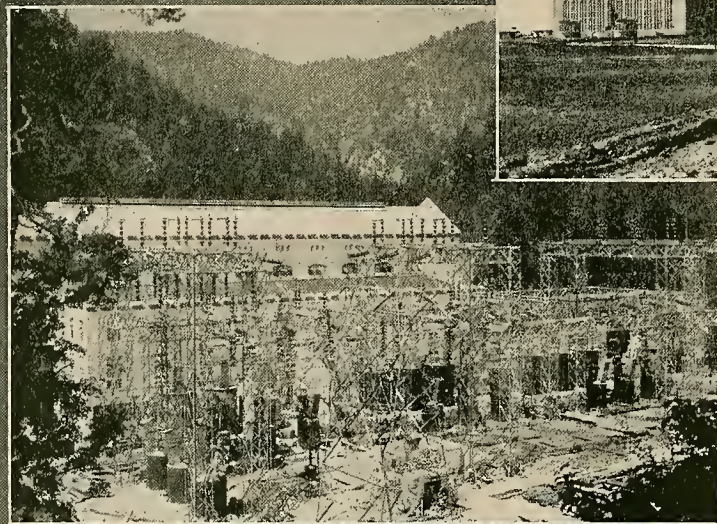


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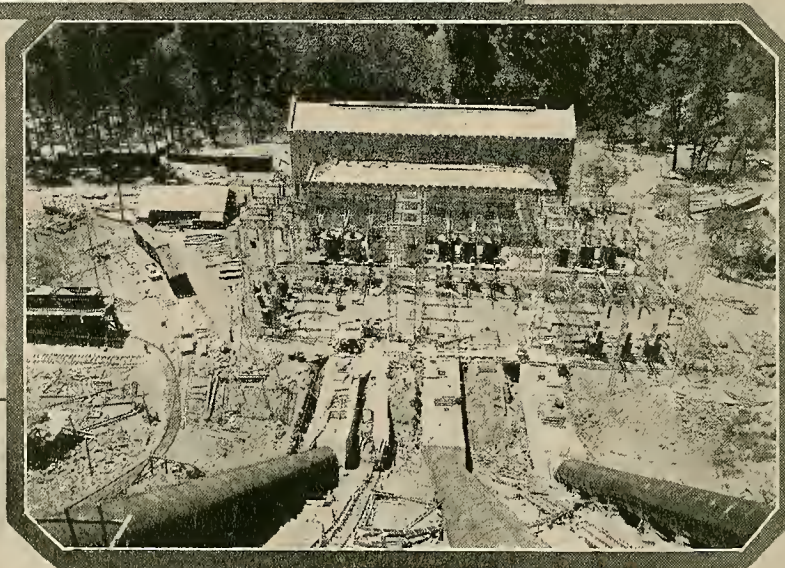
ENERGY from the Pit No. 3 plant is transformed to 220,000 volts and poured into the company's network. A view of the 220-kv. transmission line near the station is shown in No. 1. No. 2 shows the Vaca-Dixon substation terminus of the 202-mile 220-kv. Pit River line. The 220-kv. switchyard at the power house is shown in No. 3. The 220-kv. disconnect switches can be seen at the top of the bus structure. No. 4 shows the power house, bus structure, transformers and oil switches from the penstock line.



2



3



4

Second Largest Plant on Coast Completed by Pacific Gas and Electric Company

By G. Ross Henninger

Associate Editor, Journal of Electricity

ADDING another important chapter to the history of electrical development in the West, the 81,000-kva. Pit River Power House No. 3 of the Pacific Gas and Electric Company was dedicated officially to "Pacific Service" July 18. This plant is the second of a string of seven or eight plants contemplated by that company to utilize the 2,100 ft. of head available in the 60 miles from a point on Fall River above Fall River Mills to a point

on the Pit River below Big Bend. Of this total four plants now are complete: Pit No. 1 with a capacity of 70,000 kva., Hat Creek No. 1 and No. 2 each with a capacity of 12,500 kva., and Pit No. 3. According to present plans, the remaining plants will have been completed by about 1935. A map and profile of the entire project showing the physical relationships between the various plants is shown in Fig. 1. It will be seen that with this arrangement of the series of plants the afterbay of one plant becomes the forebay of the next. This necessitates careful consideration toward effecting the most economical use possible of the available water. Each plant is affected vitally by the amount of water passed by the plants above. Of course, it will be necessary from time to time to have units out of service for purposes of repair or inspection. At these times it is essential that water requirements for the lower plants be taken care of. Thus it was as necessary to give as careful thought to the question of the proper number of units to install as it was to consider the economic factors of first cost and plant flexibility.

Building

A reinforced concrete, steel-frame building houses the generating equipment and the low-tension switching equipment. The ground under the building is river deposit which has become hardened with the passage of time. The generator room is 45 ft. wide, 192 ft. long and 62 ft. high to the roof trusses. Figs. 2 and 3 show, respectively, a section through and a plan of the station and bus structure. Two 75-ton Cyclops cranes are installed here for the handling of the generating equipment. While the first cost of the two cranes and the equalizer beam was about 20 per cent greater than would have been the first cost of a single 150-ton crane, the additional cost of

PIT No. 3, fourth of a series of hydro-electric power houses being constructed by the Pacific Gas and Electric Company on Pit River was dedicated officially on July 18, 1925. This plant embodies many new ideas in design and operation. In this article the author discusses the electrical features of the generating station.

the building to provide for the heavier concentrated loads incident to a single crane would have offset this slight saving. In fact, a saving of about \$12,500 was effected through the use of two cranes instead of one. Furthermore, it is a distinct advantage to have two cranes available for the construction period. The loads usually handled during the normal operation of a power house are such that they may be handled easily by one 75-ton crane. When

loads of more than the capacity of a single crane are to be handled, use is made of an equalizer beam by which the united lifting efforts of both cranes may be applied to a single load. Only when the entire rotor of a generating unit is to be raised is it necessary to use the combined cranes.

No "generator floor" was provided, all generators being set upon pedestals. Easy access to the tops of the generators is provided by means of a walkway which continues around one end of the building from the switchboard floor. A second walkway was built along the tailrace side of the building at the elevation of the tops of the generators. This latter walkway is connected to the first by a short flight of stairs and to the platform on top of each generator. Thus it is unnecessary for an operator to descend from the control room to the ground floor and then climb to the generator tops.

Adjoining the generator room is the switch house. This is a three-story building 160 ft. long and 36 ft. 6 in. wide housing of all the 11-kv. equipment and the control room. The control room is on the third floor and is built to provide an outlook over the entire turbine floor as well as over the outdoor switch and transformer yard to the rear of the power house. All controls are located on a bench board. Hand-reset relays are located on the front of this board on the vertical panels. Directly in the rear of this board is located the main meter and relay board. Meters are mounted on the upper sections and relays on the lower portions. Two auxiliary switchboards are provided, one on either side of the main meter and relay board. Control switches for all of the station auxiliaries are carried on one of these. This is a Drendell steel-panel board and arranged to be entirely "dead front." All current-carrying parts

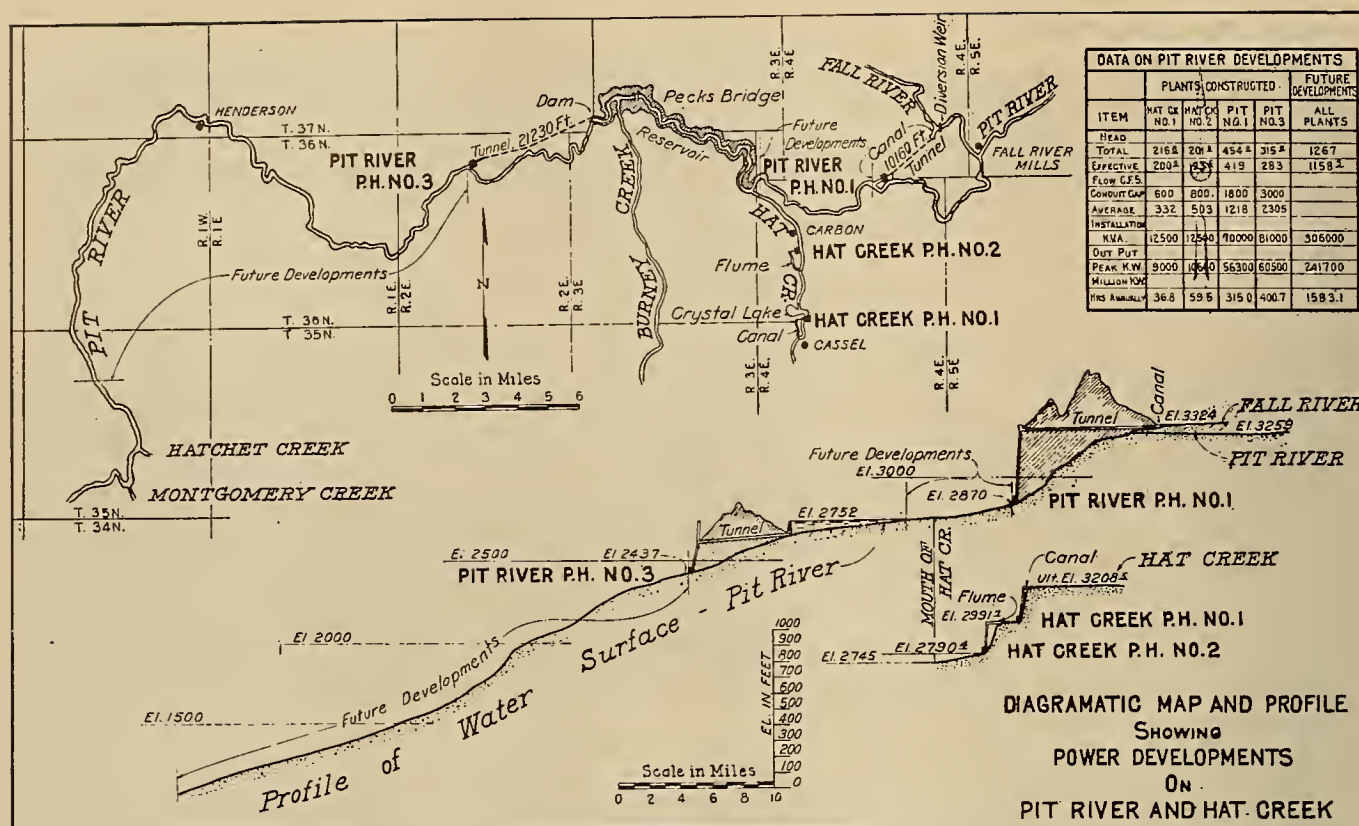


Fig. 1.—Schematic map of the Pit River covering the 60 miles in which the Pacific Gas and Electric Company is developing hydroelectric power.

are thoroughly shielded. Fuses may be replaced in the circuits through doors provided in the steel panels which can be opened only when the circuit so protected is dead. Automatic voltage regulators for the main generators, controls for the $7\frac{1}{2}$ -kw. battery chargers and for the station storage batteries are carried on the other auxiliary board. The 125-volt, 500-amp.-hr. Exide storage battery is located in a room adjoining the operating room. Duplicate motor-generator charging sets are provided.

Pacific Materials Company "Duraflex" asphaltic composition floor covering is used on the floor of the operating room. This material has a high dielectric strength and will resist puncture up to 12,000 volts per $\frac{1}{8}$ -in. thickness. In addition to this desirable characteristic the material provides a solid but at the same time resilient walking surface.

The second floor of the switch house is occupied by the main 11-kv. bus structure and the 11-kv. oil circuit breakers. The floor throughout the 11-kv. bus rooms is of 1 in. thick Trinidad Lake asphalt mastic laid by J. S. Porter Company. This one-inch flooring has a puncture value of about 110,000 volts. This structure is described in detail later in this article. Corresponding space on the ground floor is taken up by station power transformers, 11-kv. service bus, and bays through which pass the leads from the machines and transformers.

Turbines

The 33,000-hp. Pelton hydraulic turbines at Pit 3 are among the largest in the West. They are designed to operate under a normal head of 280 ft.,

each taking 1,000 sec.ft. of water at that head. Many recent improvements in design and some departures from standard practice for this part of the country are noted in this installation. Each of the turbines is of the vertical type. The cast steel casing is made up in sections the largest of which weighs 20 tons. Water enters the turbine through a 9-ft. butterfly valve which is provided to facilitate complete shut-down of the unit. This valve may be used also for control of the unit within synchronizing speed at no load in case of excessive guide-vane leakage. Control of this valve is by means of an electric motor arranged for push-button operation from a station within full view of the valve. Remote control for closing only is provided from the switchboard. Emergency hand operation is provided for. Governor servomotors for operation of the guide vanes and the relief valve are mounted directly on the turbine casing. Water which may be rejected by the turbine through quick closing of the guide vanes is bypassed momentarily through the relief valve because of the rigid mechanical connection between the guide-vane mechanism and the relief valve operating mechanism. The connecting mechanism between relief valve and servomotors is strong enough to block guide-vane movement in the event of an incident or accident of any kind hindering normal operation. Thus the relief valve serves not only to prevent damaging pressure rise in the penstock, but serves also to provide safety to the unit should a rupture occur in the pressure oil piping. The relief valve can pass 80 per cent of normal turbine water with full gate opening. These bypasses normally

are operated on the water-saving basis, but may be changed for synchronous bypass operation if desired.

Helical gears arranged on the main turbine shaft drive the governor mechanism. This eliminates the usual and bothersome belt connection between unit and governor. To steady the operation of this equipment a gear oil-pump is operated by the governor drive shaft. This pump and a duplicate motor-driven pump for starting periods furnish oil to the main turbine bearings. Each of the disk-type guide vanes is provided with thrust bearings and is grease-lubricated by means of individual hand-operated pressure lubricators. Governors are arranged for complete remote control from the switchboard. Remote control is provided also for the load-limiting device, and the position of this device is indicated at the switchboard by means of instruments devised for this purpose and located on the meter panel. Instruments showing the per cent of gate opening also are provided. A solenoid operated from relays or from an emergency push-button on the main switchboard provides for emergency shut-down.

Individual oil pressure sets for the governors are installed for each machine. Each set includes duplicate pumps, one motor-operated and the other operated by a small Pelton wheel. These sets are located on the main floor, each near its respective unit. One sump tank, a self-priming strainer for each pump, one pressure tank, one unloader and the necessary valve arrangements to permit either pump to deliver oil from the sump to the pressure tank complete this equipment.

License to use the Moody spreading draft tube was supplied by the Pelton Water Wheel Company as part of its contract. This type consists of a spreading cone inside of the draft tube. This may be seen in Fig. 2. The upper section of the draft tube is designed to be easily removable to facilitate the removal of the turbine runner without disturbing the generator. Reinforced concrete comprises the balance of the draft tube, including the central cone. Construction of draft tubes for the size units installed at Pit 3 is expensive at best. The concrete

bulk is large and the form work complicated. If the guarantees of the turbine makers are to be realized the draft tubes must be constructed accurately to specifications and must present smooth flow surfaces. Thus the form work is expensive and much hand work involved in providing the necessary smooth concrete face.

At Pit 3 construction costs were reduced and a better job secured through the use of steel liners for the draft tubes. These liners were made up of $\frac{3}{8}$ -in. steel plates, butt-strap riveted on the side away from the water surface with counter-sunk rivets. These liners acted as forms and as such required only rough shoring to hold them in place and prevent deformation during the pouring operation. Furthermore additional resistance to erosion is offered by the steel liners.

Generators and Equipment

Three main generators supplied by the General Electric Company comprise this division of the equipment. Each unit is rated 27,000 kva. at 0.9 lagging power factor, 3 phase, 60 cycle, 11 kv., and operates at 225 r.p.m. One 160-kw., 250-volt exciter is mounted on the upper end of each generator shaft. Each exciter is designed to supply only its corresponding generator. Cooling air for the generators enters from the operating room, passing into the windings through the open center of the pedestal which supports the generator. The heated air is discharged into a sheet metal housing which conveys it to the exterior of the building on the tailrace side. Exit is through metal louvres in the walls of the building. When it is desirable, heated air may be exhausted into the operating room through doors provided for the purpose in the generator air-housing. For regulating the amount of discharge opening and consequently the proportion of air discharged to the atmosphere, doors are provided inside of each louvre. These doors are operated from outside the air housing. These as well as those for passing air from the housing into the operating room all are automatic and arranged to close automatically from any position upon the operation of the generator differential relays. This serves to stop all ventilation and would assist in quelling a fire

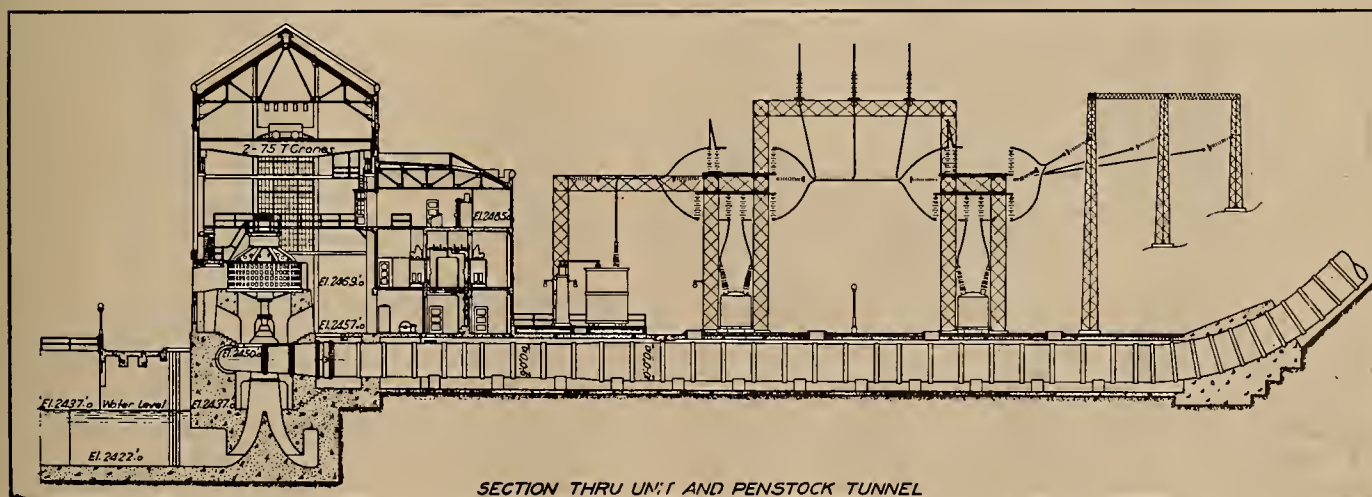


Fig. 2.—Section through a generating unit, penstock tunnel, power house and bus structure.

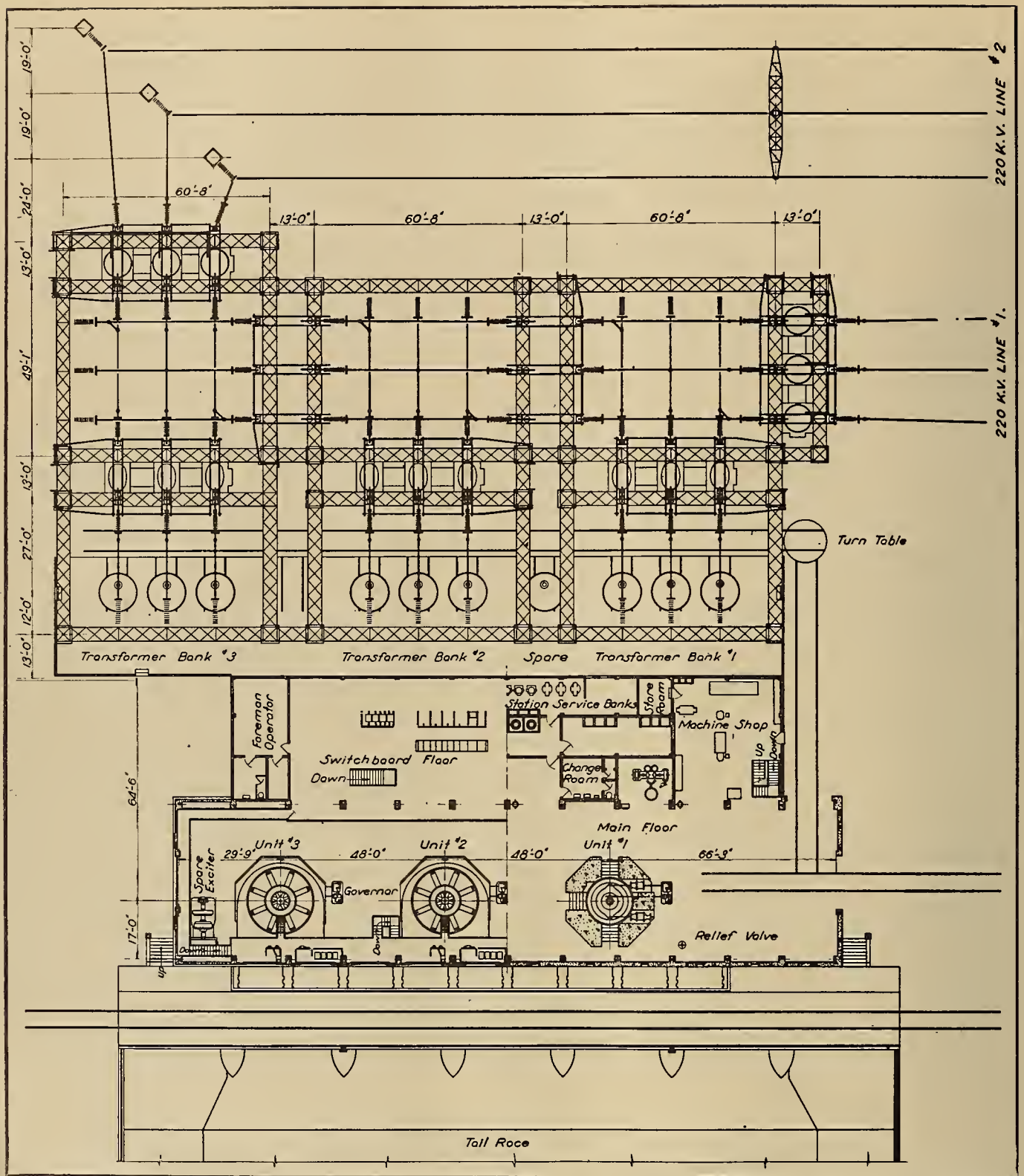


Fig. 3.—Plan view of power house and bus yard with a partial section of power house indicating arrangement on main floor beneath switchboard floor and showing section of generator pedestal.

within the machine. For additional fire protection water jets have been arranged in each machine to drench most effectively the winding.

As before mentioned each main exciter is designed to supply only its own generator. No means of interconnection between exciters is provided. Emergency exciter service is obtained from a spare set consisting of a 160-kw., 250-volt, 225-r.p.m., d.c.

generator driven either by a 250-kw., 440-volt, synchronous motor or by a 275-hp. Pelton wheel. When driven by the water wheel the motor may be inverted to deliver 440-volt a.c. energy for station service during emergencies. This is a unique feature and one which serves well. No exciter switchboard has been provided. Exciter rheostats and the necessary field switches are located as near as possible to their

respective units and placed along the balcony or walkway on the tailrace side of the building. This places them where they are fully visible from the operating floor as well as from the control room, where the ventilation is good and where they are accessible. All of this equipment is remotely controlled from the main switchboard. While exciter units for any other unit without interrupting the operation of the main generator in question.

All generating units are fully controlled from the main switchboard, the operator stationed there being able to start, stop or regulate the various units in any way desired.

Six leads are brought out of each main generator in order to provide positions for current transformers to supply differential relays. The neutral leads are joined and solidly grounded through a disconnect switch immediately after they pass through the differential current transformers. Two 500,000 circ. mil copper cables complete the connection to the main station ground. Grounding switch and differential current transformers are located in a depression in the generator pedestal. Main leads from each generator are of varnished cambric cables carried in fibre ducts to the 11-kv. switch and bus structure on the second floor of the switch house.

To provide full flexibility and also to conform to what is considered best operating practice for the company's system, the 11-kv. equipment includes a full double 11-kv. bus. The bus sections for each of the three units and for the station and local service are each one complete in itself and separated from the neighboring section by an open floor space. Physical details of the the 11-kv. bus structure are shown clearly in Figs. 4, 5, 6, 7, and 8. Reference to these will obviate the necessity of a discussion here. A wiring diagram is shown in Fig. 9 and indicates clearly the metering and protective equipment. Hence a discussion of these features is likewise unnecessary.

This arrangement of the 11-kv. equipment permits synchronizing on the low tension side of the transformer banks. This is more satisfactory for 220-kv. operation for several reasons. Two of the most important of these are that the 220-kv. oil circuit breakers are much heavier and far more sluggish in operation than are the 11 kv. breakers, and that the cost of 220-kv. potential transformers is quite prohibitive when necessary solely for this purpose. Furthermore and in support of the existing arrangement is the fact that the characteristics of the 220-kv. lines often make necessary the operation

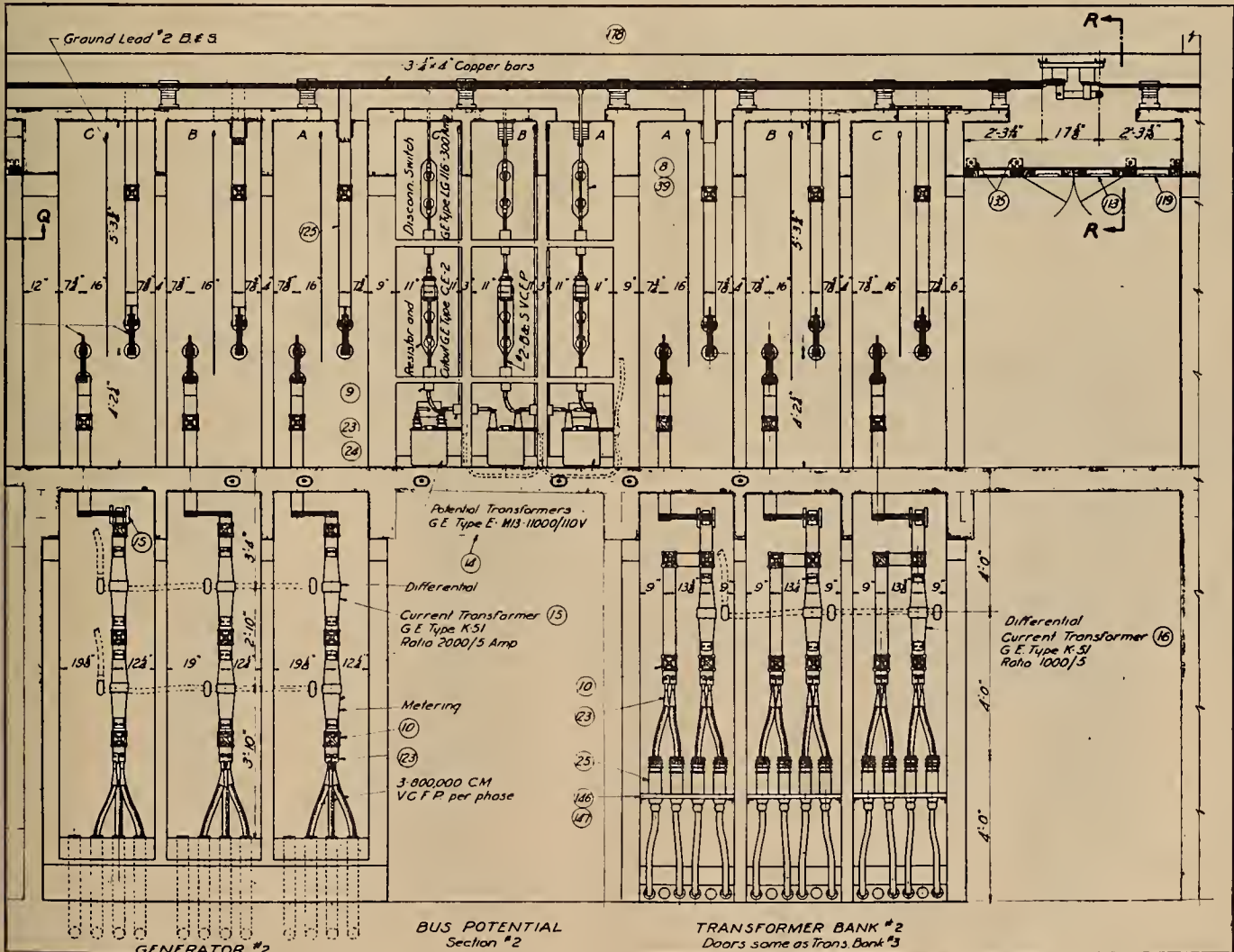


Fig. 4.—Longitudinal section through typical generator-and-transformer section of 11-kv. bus. This shows the arrangement of the cable leads, disconnecting switches, instrument transformers, main bus and bus sectionalizing switch.

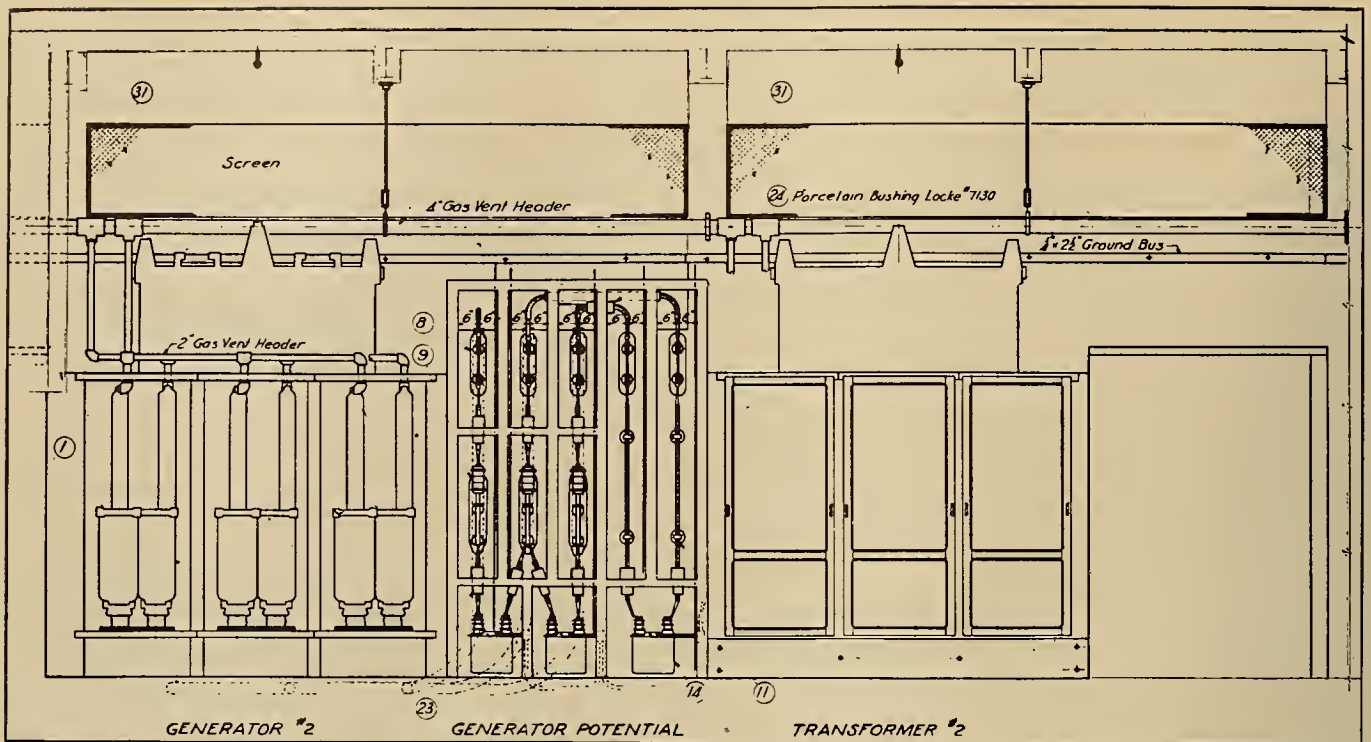


Fig. 5.—Longitudinal section through typical generator-and-transformer section of 11-kv. bus showing arrangement of oil circuit breakers, main leads, cell doors and screen wire protective covering for upper cells.

of the generators on very light fields. Under this condition they are easier to hold in step if paralleled on the 11-kv. side.

220-kv. Bus

A 27,000-kva., 11/220-kv. bank of Westinghouse transformers for each machine is situated along the edge of the 220-kv. switch yard directly in the rear of the switch house. One spare unit is provided.

These transformers are oil-insulated, water-cooled, outdoor units and are connected on the high side to give a line potential of 220 kv.

The 400-amp., 220-kv. Westinghouse oil circuit breakers are not materially different from those used for somewhat lower voltages. The greatest problem in connection with the whole switching layout is the air-break switch design and layout for

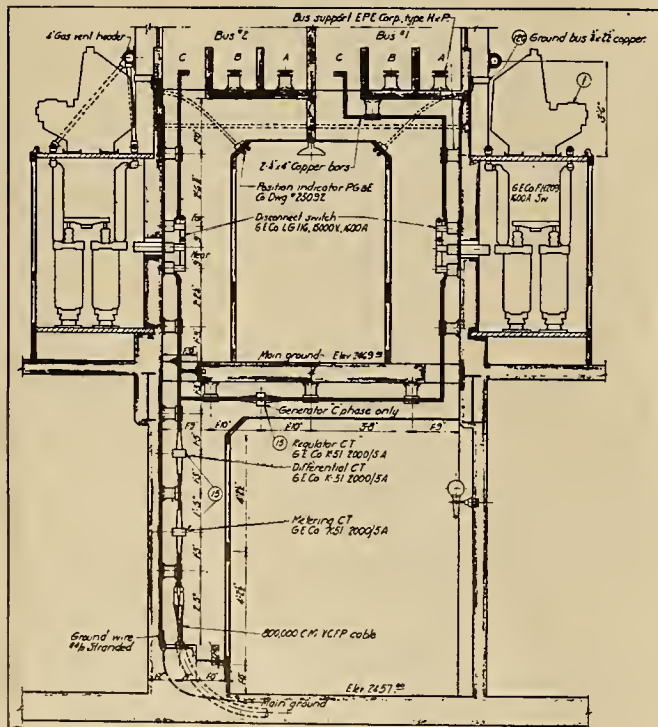


Fig. 6.—Transverse section through typical generator cell showing (below) main floor and (above) 11-kv. bus floor.

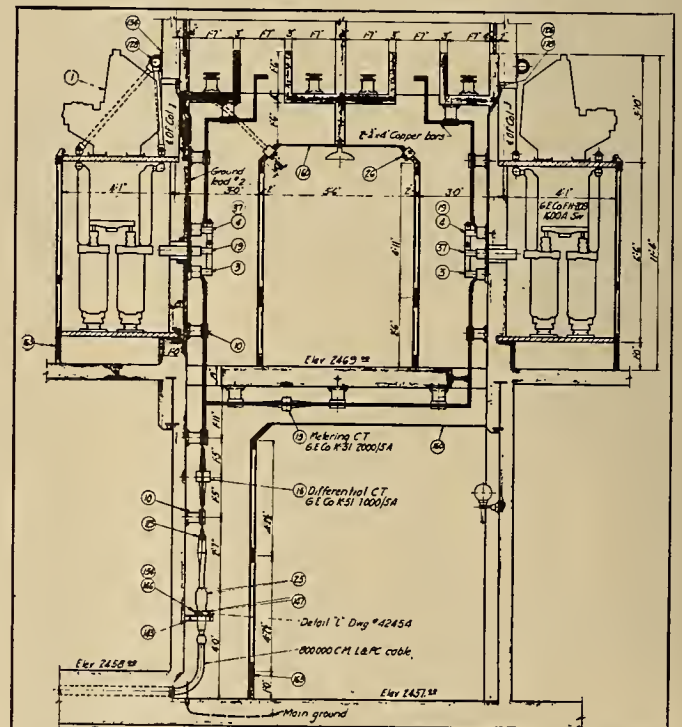


Fig. 7.—Transverse section through typical transformer cell showing (below) main floor and (above) 11-kv. bus floor.

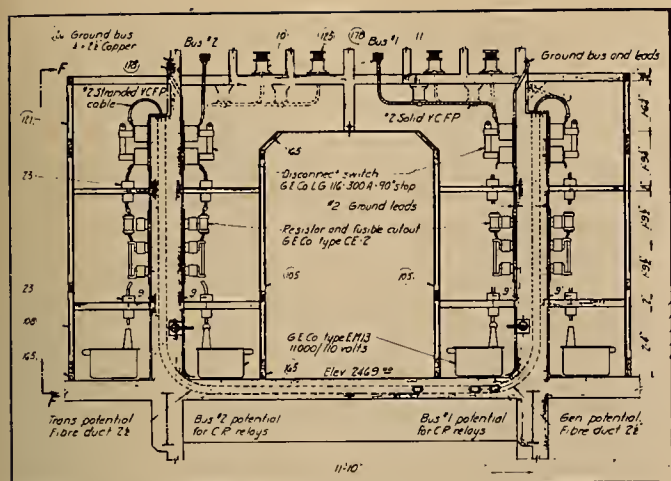


Fig. 8.—Transverse section through typical instrument transformer cell on 11-kv. bus floor.

the 220-kv. circuits. The type of disconnecting switch previously developed for the initial 220-kv. stations with a few minor improvements again was installed. These switches were built by the Pacific Electric Manufacturing Company under the supervision of the engineering department of the Pacific Gas and Electric Company. To date at least these switches in their various locations on the system have operated satisfactorily and fulfilled all the demands placed upon them. The 220-kv. by-pass switches and the disconnecting switches for the same voltage differ slightly as may be noted by referring to Fig. 10.

The arrangement of the by-pass switch consists of a stationary pivot carried on a stationary insulating pillar and another pivot carried on an insulating pil-

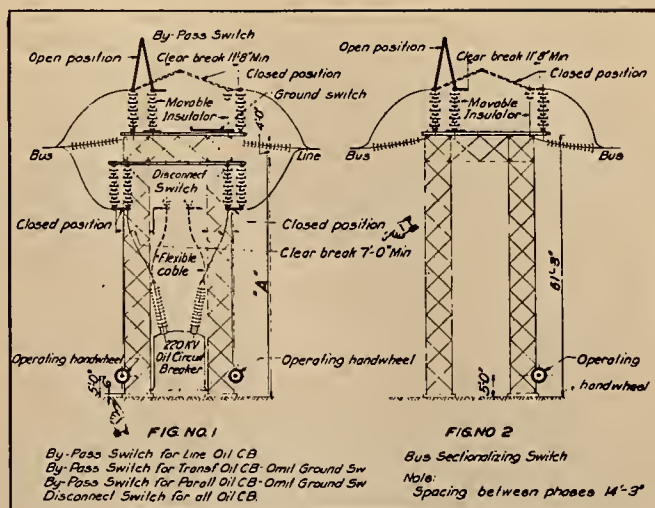
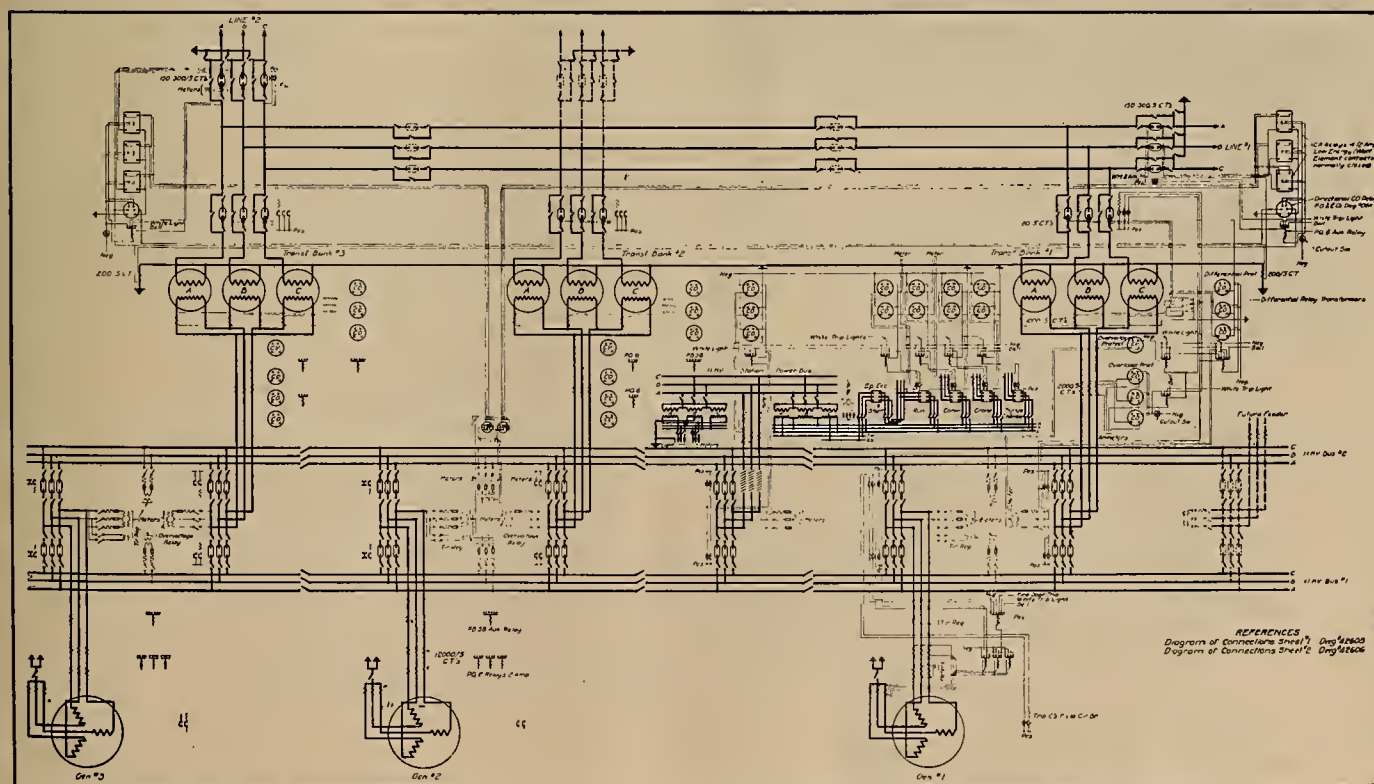


Fig. 10.—Showing arrangement of 220-kv. air-break switches.

lar mounted on a dolly which travels in a channel-iron track. Between these two is the jack-knife switch blade which operates in a vertical plane as the dolly is moved one way or the other to open or close the switch. An engaging clip protected from excessive corona loss by a long, bell-shaped hood is mounted at the moving end of the switch blade. A similar arrangement is provided on a third insulating pillar and forms the remaining terminal of the by-pass switch. The disconnecting switch is the more simple of the two. With this switch is was not necessary to use the jack-knife blade. Instead there are two moving clips each of which is carried on a pillar-type insulator similar to those used in the by-pass switches. As indicated in Fig. 10 the operation of



away. Normal operation of this part of the system calls for the use of the Pit 1 machines for charging purposes. Hence it was unnecessary to install machines of this size at Pit 3. This made it necessary to give more consideration to other operating and economic questions in selecting the units for Pit 3. Approximately 3,000 sec.ft. of water will be available at Pit 3 during times of maximum stream flow and during the short daily peaks. The yearly average flow is 2,400 sec.ft. Studies of stream flow extending over a period from 1917 to 1922 established these facts. Studies of the best division of units led to the choice of three. Each of these is capable of operating on 1,050 sec.ft. under an effective head of 307 ft. This will be the head with usual operating conditions under which two units will be in service. Maximum tunnel flow of 3,000 sec.ft., 1,000 sec.ft. per unit, under an effective head of 280 ft. will be utilized when all three units are in operation. Under the former condition each turbine will produce 33,000 hp. and under the latter condition 29,000 hp. This arrangement provides ample operating margin to care for shutdowns.

The grounding system for all of the electrical equipment is shown in Fig. 11. A single ground system is provided to care for all station grounding requirements. Two copper grounding plates each 5 ft. wide and 30 ft. long are buried one on either side and below the bed of the tail race in permanent moisture. Separate cables run to each grounding plate providing duplicate paths to ground to insure a reliable ground in the event of failure of the lead in either path. All grounds, both from generator and transformer windings, as well as from switch and transformer tanks, penstocks, and other metallic structures are connected in on the same grounding system, and ample copper is used to insure a low resistance path for all grounds.

Usual operating practice on the system of the Pacific Gas and Electric Company calls for one hydroelectric plant to do the regulating for the entire system. Under this scheme the rest of the plants operate under block load as determined by the load dispatcher. Thus the load-limiting device in the control mechanism of each unit will be in use a large share of the time as the plant will operate as a "run of river" plant, carrying the largest block load consistent with river flow and system load demands.

Three operators per shift is normal for Pit 3. The first operator is stationed at the control board where he can control directly most of the electrical equipment of the entire station. He is in charge of the station. The second operator has no set station, but is subject to the direction of the first operator. The operation of all disconnecting switches under the directions of the first operator falls to the lot of the second operator. Entire care of the turbine and the operation of the necessary valves to prepare the turbine for operation or shutdown is the duty of the third operator whose station is on the turbine floor where he can keep watch of his machinery. Other miscellaneous machinery also comes under the care of the third operator.

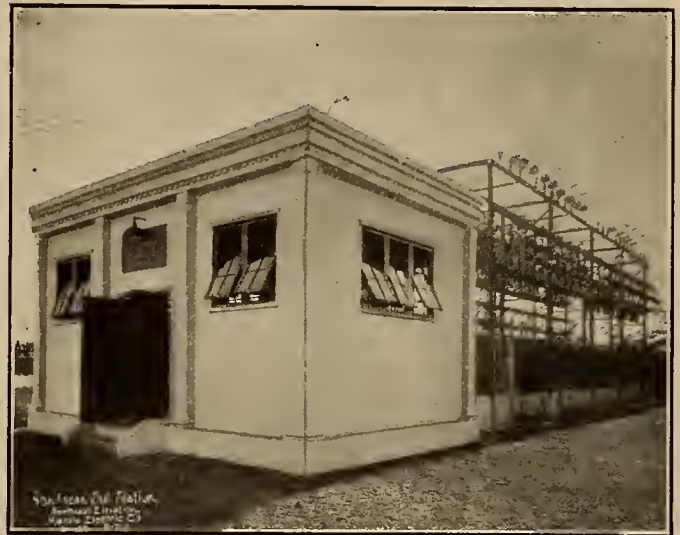
Construction work on the 4-mile tunnel actually was started Aug. 5, 1923. Preliminary opera-

tions were started on the sites of the power house and the dam Dec. 1, 1923. Concrete first was poured at the power house July 9, 1924. Almost exactly one year after this date the first unit was first turned over, and it was with justifiable pride that the engineering department and the construction department of the Pacific Gas and Electric Company presented their latest achievement to the operating department of that company.

Manila Electric Company's Substations Arouse Favorable Comment

EMPHASIS on the importance of sightly buildings with well kept grounds is made in a letter from a reader connected with the Manila Electric Company, Manila, P. I., describing one of the substations of that company. Portions of the letter follow:

"In connection with your editorial in the May 15 issue of the Journal of Electricity under the caption,







Pandacan Substation of Manila Electric Company

'Beautification of Properties as a Phase of Public Relations,' we call your attention to the enclosed photograph of our substation at Pandacan, which is one of five similar ones in our system. These buildings house control switchboards, feeder regulators, etc., and in one case, in a larger building of the same type, a rotary converter.

"Many favorable comments have been received on the appearance of these buildings, and we feel that certainly there is nothing about them to frighten away prospective investors in the company's securities either because they are unsightly, or, on the other hand, too ornate and expensive. They are of reinforced concrete throughout, and very little added expense occurs due to the simple decorative features employed."

The trim appearance of the substation shown in the photograph furnishes excellent grounds for favorable comments. Buildings of simple architectural style in appropriate surroundings cannot help but be an asset to any company.

IDEAS FOR THE CONTRACTOR

 <p style="text-align: center;">THE ELECTRAGISTS of SAN DIEGO WELCOME THE SOUTHERN DIVISION OF THE CALIFORNIA ELECTRAGISTS TO OUR CITY</p> 		
O. W. KARL ELECTRAGIST 2185 Logan Ave. Phone M. 1182	AN ELECTRAGIST <i>advocates and upholds at all times the following high standards of business practice—</i> <i>He uses only high grade and standardized materials, knowing that inferior products cannot be serviced properly, and will not meet the needs of the public</i> <i>He does quality work in every detail of the job. In all of his transactions he specifies quality, which is an assurance of safety both in installing and merchandising.</i> <i>His servicing is dependable and trustworthy. No matter how big or small the job, he does it to the satisfaction of the customer. He competes fairly.</i> <i>He upholds the National Electrical Code. Never will he knowingly skimp a job or make an installation not in accord with the underwriters' rules. He realizes that violations are costly and reflect on his ability.</i> <i>The contractors and dealers represented on this page are the only firms in San Diego who have met the strict requirements of the Association of Electragnists - International, formed in 1921.</i>	CALIFORNIA ELECTRIC WORKS ELECTRAGISTS 800 F St. Phone M. 272
J. F. ZWIENER ELECTRAGIST 1224 3rd St. Phone 633-51		MAYER & BOYCE ELECTRAGISTS 644 7th St. Phone M. 1653
C. C. CLARDY ELECTRAGIST 1017 Market St. Phone 666-20		INDEPENDENT ELECTRICAL CO. ELECTRAGISTS 928 7th St. Phone 654-12
SMITH & DODGE ELECTRAGIST 818 F St. Phone M. 354		SOUTHERN ELECTRICAL CO. ELECTRAGISTS 3rd and E. Sts.—7th and Broadway Phone Main 4730 <i>The San Diego Consolidated Gas and Electric Co. join in the welcome to the California Electragnists, Southern Division</i>
E. R. DAMARUS ELECTRAGIST 3444 Granada Phone Hill 3435-W		
 <p style="text-align: center;">FOR DEPENDABLE ELECTRICAL CONSTRUCTION AND MERCHANDISE DEAL WITH AN ELECTRAGIST YOUR ASSURANCE OF SAFETY</p> 		

Copy of advertisement used by San Diego Electragnists to welcome members to the city and also to tell the public something of the business ethics advocated by Electragnists

THE ELECTRICAL CONTRACTOR

By S. W. LEAVER

I've followed this little old 'lectric game for nigh on to twenty year,
I've had my ups and down just the same as you all must have had that's here.
I've made some good money and spent some more, and I've worked with the tools myself,

I've kept my own little retail store with a nice, clean stock on the shelf.
I've figured some jobs by guess and by rule, I've tried both the old way and the new,
I've weighed and measured and guessed like a fool and I've counted each socket and screw.

I've allowed for the overhead—heat, light, and rent; not an item I've missed I'll be bound,
But when I've collected the very last cent there's never enough to go round.
So I have decided this contracting game is not a safe one to be played,

I'll work just as hard and figure the same, but some profit has got to be made.
Hereafter my bid for every blamed one, I don't care for whom it may be,
Will be all of my costs for the work when it's done, plus a nice little profit for me.

And now to you fellows still trying to live on the profits you never have made,
Just a piece of advice let an old timer give, 'cause he's through with the game as it's played.
Quit guessing at prices and labor that's lost and hoping 'gainst hope you'll push through,
Take all future jobs on a basis of cost—plus a nice little profit for you.

Advertising Used in Welcoming Electragnists to San Diego

In welcoming the electragnists of the Southern Division of the California Electragnists to the city at the time of their quarterly meeting, the San Diego electragnists made use of a full-page advertisement in each of three papers.

They also took this opportunity to tell the public something of the business ethics which are advocated by electragnists. Among these were included the use of high grade standard materials, quality work, dependable servicing, and the upholding of the National Electrical Code. In the advertisement they also announced their individual affiliation with the Association of Electragnists, International.

The members of the local association in that city are firm believers in the value of advertising and feel that it affords an excellent means of selling the public the idea of having an electragnist serve their electrical needs.

Bachelor Has Complete Electric Home Built for Himself

An unusual electrical home recently was completed in Cotati for R. J. Beck by H. W. Jacobs, Santa Rosa electragnist. Although Mr. Beck is a bachelor, he believes in enjoying the comforts of a thoroughly modern home, which is completely electric. The heavy-duty electric equipment in his home includes a 5-kw. Wesix water heater, six Wesix flush-type air heaters and two portable ones, and a Hotpoint-Hughes super-automatic range. Besides these, he has an electric sewing machine, washing machine, iron, waffle iron, toaster, percolator, drink mixer, and a radio.

Mr. Beck does not stop with having a complete electric home, however, and has his chicken yards electrified, including electric incubators, brooders, feed mixers, outside lights, and pumping plant. The installation has been very satisfactory and Mr. Beck is an ardent advocate of more complete electrification of farms and homes.

Standard Symbols for Wiring Plans Distributed to Electragnists.—The A-A Wire Company of New York recently has had a chart prepared showing the "Standard Symbols for Wiring Plans" as recommended and adopted by the Association of Electragnists, International, The American Institute of Architects, and the American Institute of Electrical Engineers, and approved by the American Engineering Standards Committee. The chart is mounted on beaver board in attractive form. It is being distributed by the A-A Wire Company to all members of the Association of Electragnists, International. This chart will be particularly advantageous to contractors when drawing plans. Its distribution is one of the many ways in which manufacturers and jobbers are cooperating with the members of the association.

Neighborhood Meetings an Aid to Contractors

Unusual Procedure Inaugurated by Electrical Contractors in Los Angeles Producing Effective Results

By J. R. WILSON

The Electrical Contractors and Dealers Association of Los Angeles recently has evolved a very unusual method of solving the problems confronting electrical contractors in the city by having neighborhood meetings in different sections of the city to which all contractors are invited. Estimating methods, cost accounting and similar subjects are discussed at these meetings.

Previous to Sept., 1924, the conditions in the electrical contracting business in Los Angeles were about as bad as could be found anywhere. The license fee to do electrical contracting was only \$50 per year with a nominal bond. Los Angeles has conditions to contend with that probably no other city in the country must face. A great many people come from the East to enjoy the climate and other attractions and arrive with a very limited capital. If they do not get employment in a short time after arriving, they decide to go into business. Owing to these conditions, the electrical contracting field was very much overcrowded, there being over 800 registered electrical contractors. The result was that no one was making any money, and the public was suffering from incompetent, unreliable contractors.

The members of the Electrical Contractors and Dealers Association got together to canvass the situation and see what could be done to better conditions. After a number of lengthy meetings it was decided that the solution lay in weeding out the undesirable contractors and safeguarding the public by requiring all electrical contractors to pass an examination given by the electrical inspection department. To protect the public further, each contractor was required to post a surety bond of \$1,000, and the license fee was raised to \$100 per year. All contractors, including those who had been in business for fifteen to twenty years, were required to go through the same procedure before they could do business.

After presenting the facts to the city authorities, the necessary ordinance was drafted and passed as a safety measure to life and property. It was only a short time until the number of electrical contractors was reduced to less than half of the number previously registered.

Through a mistaken idea of the relation of volume to profit, a majority of the bungalow contractors seemed to think that because they were paying a larger license fee they must do a much larger volume of work regardless of profit. This led to deplorable price-cutting, with outlets being figured at anywhere from \$1.95 to \$2.65 each, and in most cases the service wiring, meter loop, and electric bells were included free. (Editor's note: All wiring in Los Angeles must be in conduit.) Of course a condition like that could not exist for any length of time, and the results were soon apparent by the number of electrical contractors who were failing in business. While all these things were taking place the association continued to grow slowly, taking in a new member now and then, among these being J. Arthur Curtis, by his own definition a typical "curb-stoner".

Mr. Curtis has been largely responsible for many of the changes that have occurred. Previous to becoming a member of the association, he had given a great deal of thought to the conditions existing in the business. His line of reasoning led him to the conclusion that the problem would not lend itself to solution in its entirety but must be attacked purely as a neighborhood proposition. The Los Angeles territory is too large and the number of men concerned were too many ever to get them together at any one time. It seemed to Mr. Curtis that he could best work with the men whom he met in direct competition. Everyone he talked with agreed that the business was sick and needed doctoring. He conceived the idea of having them meet at his store to see what could be done.

The topic for discussion at that first meeting was "What is your cost of doing business?" The results were gratifying and it was decided unanimously to hold the meetings each week thereafter. The members of the association grasped the significance of the neighborhood meeting idea and the simplicity of its operation, and it was discussed from all angles.

In all branches of industry only those movements succeed which have the backing and strength of the associations behind them. So with the neighborhood meeting idea—it required the backing of the Electrical Contractors and Dealers Association to be a success. This was the unanimous opinion of those interested; it was agreed that to succeed in the highest degree it was necessary to formulate a plan that would be holeproof; also to place the responsibility for the operation of the plan on the shoulders of men who were known to be experienced in handling meetings. As the association was already functioning, it was only natural at the beginning that the machinery of operation should be controlled from their headquarters.

William Brainerd of the California Electrical Bureau in Los Angeles had been devoting a large amount of his time to educating the local contractors along the lines of better merchandising, cost finding and cooperation.

After due consideration having been given to all the elements which entered into the proposition, the following plan was adopted as best suited to the existing conditions: Mr. Brainerd was already in the field and was known to the majority of the contractors; he was also familiar with the general territory in which each man operated. At his suggestion a large size map of Los Angeles was obtained and the city was divided into eight districts of neighborhoods.

The executive committee of the association then chose an active association member, whose place of business was located in that district and appointed him temporary chairman for the district. A movement of this kind must be operated on absolutely non-partisan lines. This fact was recognized and it was agreed by all parties that the association must be relegated to the rear, at least temporarily.

The solution of the problem to be met required the services and the ideas of every electrical contractor in the territory. The thought of the non-member was just as essential as that of the association member. There were more contractors outside of the association than were in, and the problem was a community affair.

The temporary chairmen were expected only to call on the contractors in their district, arrange the time and place of the first meeting, and then probably be succeeded by some non-association contractor as chairman. The first few meetings were rather hard to get started as most of the men were meeting their competitors face to face for the first time. Each man was given an opportunity to express his opinion as to what was wrong with the business and to advance a possible remedy. The majority were of the opinion that the work was being taken too cheap, but as long as John Doe did it they had to do the same.

The first meetings served to get the contractors acquainted with each other. The executive committee decided that the chairmen of each section should meet each Tuesday noon at lunch and district problems should be offered for solution at that time.

It was decided to hold a general open meeting inviting every electrical contractor in the city to attend. For this meeting the following program was adopted: Invitations were sent to every electrical contractor in the city, and a reception committee met each one as he entered and had him register, at the same time giving him a copy of the Electragists' estimating sheet.

Each district chairman was responsible for the attendance from his section, and approximately 75 per cent of all the contractors were present. The district chairmen gave a number of talks at this meeting including the following subjects: Cooperation, possibilities of neighborhood meetings, estimating, and the necessity of organization work. This meeting was a success, and it was decided to hold one general meeting each month.

The activities had progressed so satisfactorily that it was decided to employ a regular field man. His duty is to interview contractors in each section, investigate reported unethical conduct, and to work with members in teaching them cost-finding. To finance this plan the association allowed those wishing to become members to join for the nominal dues of \$5 per month, all moneys so collected being deposited in a special fund for organization purposes only. The association contributed \$200 to establish this fund.

A committee on cost-finding gathered figures pertinent to costs of materials and labor on outlet work. The committee realized that the method of estimating by outlets was about the poorest method of estimating that could be used. They also realized that the smaller contractors did not have the time accurately to estimate each job on a quantity basis. However, they felt that if a man kept accurate job cost records and his price per outlet was high enough, the law of averages would give him a reasonable margin of profit on business taken by this method.

The plan is showing satisfactory results; the morale of the majority is high, and some contractors who never made money before are now discounting their bills.

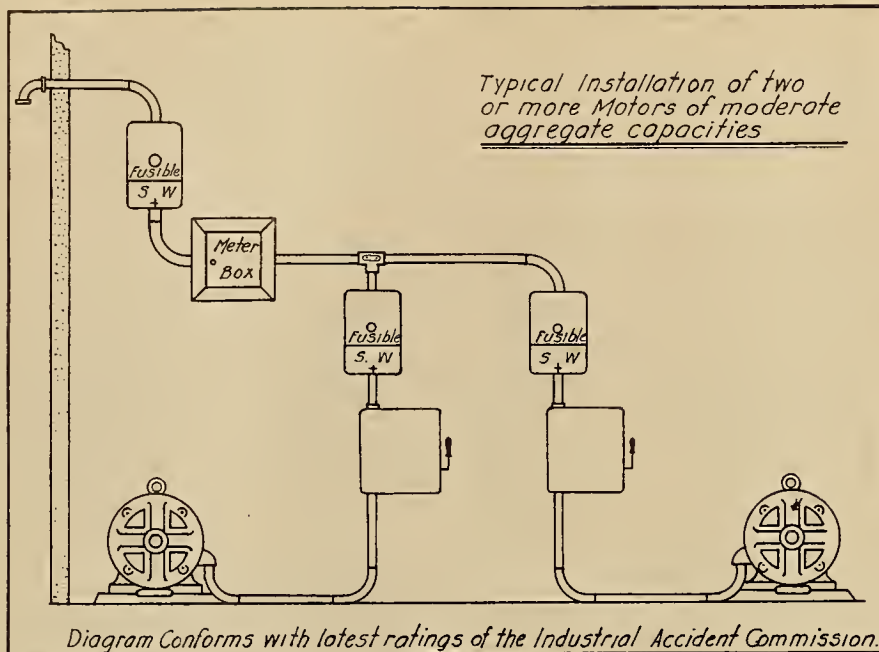


Fig. 3

Safety-First Installations for the Electrical Contractor

The Aug. 1 issue of the Journal of Electricity (p. 96) contained a discussion of a single motor installation when the motor is not within sight of the operator. This was the second of a series of five which will show five different types of installations commonly made by the electrical contractor.

Fig. 3 shows a typical installation of two or more motors of moderately small capacity. It will be noted that as in Figs. 1 and 2 the service is brought directly to the fusible disconnecting switch just above the meter box and then led to the fusible disconnecting switches ahead of the starting equipment for each motor.

Again, it will be seen that all equipment is in sight of the operator and any piece of apparatus can be worked with perfect safety provided the operator watches to see that he has a dead circuit through the disconnecting switch of the circuit he intends to work on.

This same installation may be carried on for as many motors as the installation requires.

Closed-Shop Agreement Illegal Ohio Supreme Court Rules

The Supreme Court of Ohio recently ruled that a closed-shop agreement, when taking in an entire industry and operating generally in a community so that it prevents or deters men from working, is illegal. Ohio now follows the settled rule laid down in the courts of many states, including New York, New Jersey, Connecticut and Massachusetts.

The language of the Ohio court follows: "Contracts by which an employer agrees to employ only union labor are contrary to public policy, when they take in an entire industry of any considerable proportions in a community, so that they operate generally in that community to prevent or seriously deter craftsmen from working at their craft, or workmen from obtaining employment under favorable conditions without joining a union."—National Bulletin, Association of Building Trades Employers. The ruling of the Supreme Court of Ohio as given above is important from the standpoint of the electrical contractor, as similar agreements frequently are advocated.

Street Lighting Model Used to Sell Better Installations

One of the most interesting exhibits in connection with the recent N.E.L.A. convention was the street lighting model loaned by the Edison Lamp Works to the convention for the purpose of arousing interest in street lighting. This model was designed and constructed by B. Audsley; the wiring and illumination effects were designed and installed by T. P. Brown, both of the Edison Lamp Works.

It is often so difficult for lay people, and even for those interested in street lighting, to visualize their local streets under different intensities of lighting. This model was constructed to supply that visualization. The buildings along the street are all representative buildings of a typical American business street, and have been constructed to the scale of $\frac{1}{8}$ in. to 1 ft. The wiring and lighting devices have been so arranged that it is possible to make the street bright enough for a town of 5,000 population, or of 5,000,000 population, or of any size in between. By a single turn of a switch it is possible to give any desired spacing of standard with any desired size of lamp, thus allowing a lighting company, or some city fathers, or a group of merchants, to see how their street looks at present and how it can be made to look with larger sized lamps. In fact, there are some 200 different combinations of street lighting in the model.

Of interest also to the merchant is a visual story showing how they can increase the number of window shoppers by increasing their show window lighting.

Sign lighting also is treated. There are seven different types of signs, each having its own particular appeal and each telling its own story.

Traffic control is a serious problem on every busy street. In fact, no business street can function properly without traffic regulation. This model shows a type of traffic flashes, as well as a traffic director.

Floodlighting, affording a means of keeping a building beautiful and visible twenty-four hours a day, is shown on the model where a splendid municipal building is bathed in white, red, amber, blue and green. The model is the property of the Edison Lamp Works and will be returned to the permanent display of the Edison Lighting Institute, Harrison, N. J.



Left: Street lighting model demonstrating the effect produced with 1,500 c.p. lamps placed 75 ft. apart. Right: Triple light standards which create a lighting system which is artistic, adequate and in architectural harmony



Letters from a Secretary to a Self-Made Contractor

The Second of a Series of Communications from a Man of Experience to His Friend Just Starting Out

San Francisco, Calif.

Dear Bill:

I am glad to hear that you are off to a good start and that you are happy in your new business. After all is said and done, the best thing we get out of life is the happiness that comes from legitimate endeavor and the satisfaction that accrues from a good job well done. You may remember the lines from Shakespeare in which he says, "The evil men do lives after them; the good is oft interred with their bones." It therefore seems incumbent upon all of us to devote our time and effort to the pursuit of good things in order that there may be no evil to live after us.

This business of doing good includes so many things that it is difficult to pick out the most important. Some men consider that by being kind they have filled the bill and others feel that they have complied with the requirements when they have been good to themselves alone. My idea of the thing, perhaps because I am in contact with so many men in our line of work and consequently get so many different personal views, is that really to do good we first must consider our neighbor. This consideration of a fellowworker includes respect not only for his feelings but also for his business. Anything that we do that interferes unduly with his legitimate endeavors to make an honest living is, in my mind, an act of evil.

Perhaps this view of the situation as applied to the electrical contracting business never has appealed to many members of the industry. Surely by no other line of thought can I lead myself to believe that many of the existing conditions could be brought about. If all members of the contracting business would consider their actions as applied to themselves I am sure that many of the things that now happen could never occur. Price-cutting is certainly a form of evil and it hurts the price-cutter more, in the long run, than it hurts his competitor. The proof of this is in the long list of men, many of them with good intentions, who have gone down to a quick business death through the means of the low-priced job. There are still others who have failed because they refused to stand shoulder to shoulder with their competitors for the betterment of conditions. There are many trade associations today, in the electrical business particularly, and they are generally in existence for only one purpose—the good they can do through their assistance to their members. The association of which I have the honor to be an officer is one of these and the

state association is another. I can only hope that you will lend your support, both financial and personal, to both of these organizations. I can just hear you asking "Why"? as you read this. I'll tell you why.

How many times have you leaned back in your chair and thought—what can I get out of membership in the local or state association? What are the benefits that I am not already receiving? Is it worth the dues they ask? My answer is this: You will get out of it proportionately what you put in.

The man that puts love, kindness and cooperation into his daily home life usually is repaid an hundred fold. So it is with your business associations. Goethe has said, "Kindness is the golden chain by which society is bound together."

Attend the association meetings, not with a chip on your shoulder, but with a smile and a spirit of friendliness toward your competitor. He is in the business for the same reason you are—to make an honest living. Listen to his story and extend him a helping hand in his hour of need. Business without competition is poor business.

Attend the meetings and exchange the experiences you have had with your jobber, with the electrical inspector, and with the power company. They will probably have representatives there to take up your problems affecting their branch of the business. Learn what the other fellow's difficulties are and profit by his experience. Don't be a hermit. No man succeeds without friends—friends in his own line of business. Learn to play with your competitors just as when a boy you learned to play with your competitors in the school yard. We are only grownup boys today, and we must not forget how to play and to be kind to one another.

You ask, why must I belong to the association and pay dues to receive these benefits? Because it is through the association office that meetings are arranged and important subjects laid before the members for consideration. At these meetings the successful men, the men who have "been through the mill", deliver their messages and exchange ideas with you. Association membership should be a part of your life and of the life of every contractor-dealer. Life is an educational function and by taking the association into your life you will increase the benefits you will receive from living. We are never so far advanced that we cannot learn something from our business associates and our competitors. What we do learn we can all of us apply to our particular and individual business.

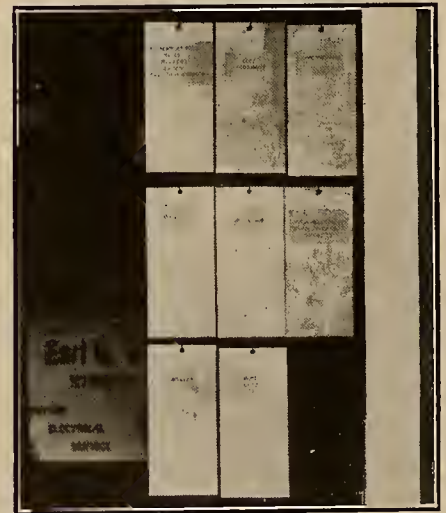
Just single out the successful men, the men that last in your line of business, and ask them what they think of membership in the association. Invariably their answers will be to this effect, "My success began with membership and regular attendance at the association meetings". The association is the "clearing house" of the contractor-dealer branch of the industry. It is the hub around which the wheel of progress revolves.

The jobbers are well organized, the manufacturers, and so are the power companies. Why, then, should the contractor-dealers be the weak link in the business and continue indefinitely to take dictation from others? "In unity there is strength." If your association should do nothing else than to show you how to work for yourself instead of for the general contractor, it would repay you an hundred fold for all the time and money you might put into it. I sincerely hope that I shall hear from you as an active and constructive worker for your local and state association.

Sincerely and electrically yours,
JOE MAGEE.

Holders for Prices of Material Sold Over Counter Save Time

As a means of having readily available the retail prices for materials most frequently sold over the counter, F. P. Schweiger, foreman for Earl G. Wilson of Napa, has designed a number of galvanized iron holders in which removable sheets are inserted containing the de-



Holders containing retail price sheets for materials frequently sold over counter

sired information. The holders are made of ordinary galvanized iron with the bottom and sides turned under so as to form a container 5¼ in. by 11½ in.

The various classes of materials are grouped together. Separate containers are provided for switches and porcelain; wire, cord and loom are in one group; as are attachment plugs, bells, buzzers, fuses and bell-transformers. Any number of such classifications could be made, depending upon the needs of the individual contractor. The prices on the materials are kept up to date by Mr. Schweiger. These cards are placed in a convenient location at the end of one of the material shelves, as shown in the accompanying picture.

BETTER MERCHANDISING

Merchandising a Complete House-Wiring System

G.E. Merchandise Division Is Conducting Drive to Sell Entire Wiring System as a Single Unit

Better house-wiring through the use of a nationally known and trademarked wiring system is the aim of one of the most aggressive sales programs ever attempted by the electrical industry. Toward this end the General Electric Company, through its recently organized Merchandise Division, has entered into a national advertising campaign to stimulate the demand for the "G. E. Wiring System—for Lifetime Service."

The campaign was inaugurated in January of this year with the insertion in a large number of magazines, periodicals and trade journals of advertising calling attention to the value of the "G.E. Wiring System." The advertising was directed toward home owners and builders, architects and the members of the electrical contracting industry. Realizing that a different message was necessary for each type of reader, the company used an individual type of copy in each advertisement. To tie all of the advertisements together, all of those appearing approximately simultaneously carried the same illustrations, despite the fact that the copy was directed toward a particular class of reader.

As one of the first adjuncts to this advertising campaign, the company prepared a 40-page illustrated booklet, "The Home of a Hundred Comforts." This booklet was featured in the advertisements directed toward home owners, and to avoid the distribution among only idly curious persons a small charge was made.

The booklet, written in a conversational style, takes the prospective home owner into the house by the front door, and after telling of the advantages of a complete wiring system, explains in detail the proper wiring practices to make "The Home of a Hundred Comforts." The reasons for each lighting outlet and switch are explained, and at the same time the advantages of the particular method of installation are shown. The location of and the reason for convenience outlets are portrayed vividly, and the prospective owner is shown how each member of the family will benefit by the installation of an adequate wiring system. In the kitchen, particularly, great stress is laid upon the convenience that accrues to the housewife through the use of electrical devices when proper preparations have been made at the time that the house is wired.

From the first floor the reader is taken to the second where the advantages of a well planned wiring system are explained. From there the text leads to the cellar and garage, showing the necessity for adequate wiring in those portions of the home that often

are forgotten because naturally attention is paid to the parts of the house that are used more frequently.

To present even a more vivid picture to the prospective owner the booklet contains isometric drawings and outlet diagrams of both the first and second floors of the house. The conduit runs, together with the exact location and type of outlet, are specified on the diagrams, and in the attached text key figures indicate the type of wiring materials best adapted to the installation. In addition, two alternative sets of specifications are presented, giving the reader slightly different suggestions for the wiring of the house. As the booklet states, the specifications suggested are by no means the only combinations that could be employed under the "G.E. Wiring System," as the system could be adapted to any house that the builder might erect. The purpose of the book, then, is to stimulate the desire for adequate wiring and not to specify the manner in which the work should be done.

Following the description of the wiring system, the booklet informs the reader of the purposes of the "G.E. Wiring System," which it states is a "system of house-wiring embodying adequate outlets properly placed, conveniently controlled, and using G. E. materials throughout." Then follows a description of the materials used under the system sponsored by the company.

That the house owner may know of the small cost of operating electrical devices, one of the pages of the book is devoted to a tabulation showing the hourly operation cost, the energy cost being figured on a basis of 10 cents per kw-hr.

While the booklet is being distributed from the offices of the Merchandise Division at Bridgeport, arrangements may be made for distribution by local electrical contractors desiring to stimulate interest in the "G.E. Wiring System."

From the description of the booklet it may be seen that the purpose of the company is to advertise a wiring system and not individual parts of the system. One of the main purposes of the entire advertising and selling campaign is to build up the standard of wiring and encouraging the use of General Electric Company materials. Another aim is to instill confidence in the mind of the builder to the end that he will feel it unnecessary to worry about the individual items in the house-wiring system, but instead will rely upon specifications set down under the "G.E. Wiring System" and thus specify this wiring system by name.

The plans as prepared by the Merch-

andise Division of the company also provide for extensive services for the aid of architect and electrical contractors. Two of the most important of these are "Electrical Specification Data for Architects" and "Electrical Specification Data for Contractors." These booklets will be ready for distribution about Sept. 1.

The architects' book, designed to assist architects in the preparation of house-wiring specifications, is divided into five sections. Each section covers a particular group of houses being classed according to the residence valuation as follows:

Group	Residence valuation
1	\$ 6,000 to \$12,000
2	12,000 to 18,000
3	18,000 to 25,000
4	25,000 to 35,000
5	35,000 to 50,000

For each of these groups a simplified form of wiring specifications is presented, the form for the specifications being prepared, making it possible for the architect to copy the form and transmit it to the contractor. To present visually to the architect the type of equipment he is specifying under the "G.E. Wiring System," most of the materials entering into the job are illustrated in the booklet. After the specifications have been written according to the form in the booklet, all that is required is that the architect indicate the location of the various outlets on the drawings for the house. Mounting heights for all outlets are specified in the form. The "G.E. Wiring System" contemplates an all-metal rigid and flexible conduit installation.

The contractors' booklet, while similar to the architects', goes into more detail in giving the character of the materials to be used on the job. Methods of installation are suggested in order that the work may be done in the most efficient and satisfactory manner.

To assist the electrical contractor the Merchandise Division of the company has prepared a proposal form and an estimate sheet. The proposal form is padded and is to be filled out in duplicate by the contractor. On the form are spaces for the listing of all of the outlets that will be installed in the house, these outlets being segregated as to location and type. The estimate form, slightly larger than the proposal, is made up of eleven different items covering the estimated cost of the work to be done. Alongside of the space for estimated costs are columns for the actual costs. Two more items permit the estimator to list the total estimated cost and profit. The estimate sheet covers the job from the roughing-in to the lighting equipment incidentals.

Both the proposal form and the estimate sheet were prepared by the company following several months survey in which the needs of the contractor

doing house-wiring were ascertained. The systems comprise a combination of the most satisfactory forms used by a large number of contractors.

Another aid that has been prepared for the use of electrical contractors is the "G. E. Wiring System" job card which, when imprinted with the contractor's name, is to be placed on houses that have been wired throughout according to the specifications of the company's system. These cards, in common with the rest of the material prepared by the company, are designed to call attention to the entire system and not individual pieces of wiring equipment. A small folder giving the important points in connection with the "G. E. Wiring System" also has been prepared for contractors' use. These folders may be imprinted with the contractor's name and distributed to his prospective customers.

The entire activity in connection with establishing in the public mind the "G. E. Wiring System" is being conducted under the Merchandise Division of the General Electric Company. This part of the company was formed recently to take over activities of the Merchandise Department, which was organized about three years ago to merchandise that portion of the company's products that were sold through jobbing houses.

The new Merchandise Division is a

decentralized organization within the General Electric Company maintaining its factory and executive headquarters of its sales, manufacturing, accounting, credit and collection departments at Bridgeport, Conn. The Division is headed by George P. Baldwin, general manager, and H. C. Houck, assistant general merchandise manager.

Under the plan of organization the United States is divided into three zones. Each of these zones covers certain jobbing centers, the Pacific Coast territory embracing the states of California, Oregon and Washington, most of Arizona, the western half of Nevada, the section of Idaho tributary to Spokane, the Hawaiian Islands and Alaska, and being under the direction of R. M. Alvord, Pacific Coast merchandise manager, with offices in San Francisco. Necessary contact salesmen and specialists are maintained at strategic points to assist jobbers in their respective territories. The jobbing centers of Salt Lake City, Denver, and Butte are in the central district, which is under the direction of W. H. Colman with offices in Chicago. Among the items coming under the direct supervision of this division of the company are: code wire and cords, wiring devices, conduit and conduit fittings, fans, Tungal battery chargers, insulating materials and tapes, bell-ringing and toy transformers, and welding electrodes.

the subject of electric cooking or she would not have made the purchase, and is probably enthusiastic about her new equipment. The effect of her unbiased enthusiasm upon a prospect who has not yet made up her mind is often the decisive factor in a sale.

At the conclusion of the talk the names of those present are secured by asking them to leave their addresses in order that an electrical cook book may be sent them. No attempt is made to sell them electrical equipment at this time, although a salesman is always present in order to answer questions and take names of those particularly interested.

This cooking class has shown its value by the number of people who have been attracted by it, as many as 130 women attending some of the sessions. So successful has it been that the same principle has been extended to fairs and shows of all sorts where such a demonstration is possible. Classes were held in connection with the Home Beautiful Exhibit, for instance, and again in connection with the Horse Fair. These were well attended and attracted much interest, undoubtedly bringing many to the regular classes later in the company's rooms.

Baker-Joslyn Company of San Francisco and Los Angeles has sold its Seattle and Portland branches to the Jobbers Supply Company of St. Paul. The sale is the result of negotiations that have been going on for approximately two years.

The Johns-Pratt Company, Hartford, Conn., has issued catalog No. 55 containing a full listing of Noark meter service and main entrance switches, fuses, cutouts, service and fuse boxes.

The Normal Electric Company has been established recently by F. L. Byrum at 3690 Adams Street, San Diego.

Permanent Cooking School for Range Prospects

Weekly Instruction Is Used by Portland Central Station to Convince Prospects of Value of Electric Range

So much interest was shown in the electrical cooking school conducted under the auspices of the Oregonian in Portland that a permanent school has been established by the Portland Electric Power Company as part of its regular range activities.

An electric kitchen has been set up in the salesrooms of the company with complete electrical equipment. This is so arranged that it can be dismantled during the week and the space filled with a display of electric ranges. When it is needed for the cooking class, a portable dais is moved into one end of the room, the range set up, other kitchen equipment added, and the remainder of the room filled with chairs. This outfit has been standardized so that when needed it can be transported to fairs and exhibits of various sorts at a moment's notice.

The women invited to attend this class are made up of actual prospects, those recently sold ranges and others who have come of their own accord through advertisements seen in the newspaper or through the notice posted at the entrance to the building. The great advantage is in the opportunity given to convert prospects to the method of electrical cooking.

Salesmen either call, telephone or write prospects concerning the chance of attending this private school, which is conducted Thursday mornings in the company's rooms. A large proportion of those thus reached take advantage of the opportunity. In addition, all those who have purchased ranges within the past thirty days are invited. This not only helps to make them satisfied with their purchase by insuring that they thoroughly understand its use,

but the sprinkling of actual users of electric cooking among the audience has a good psychological effect. Women on such occasions are apt to speak in a friendly way with their neighbors, and the natural subject of conversation is the use of the electric range. The new purchaser has been sold thoroughly on



The window display of The Electric Shop, the Boise local office and division headquarters of the Idaho Power Company, was presented in connection with the fifteenth anniversary of the Boy Scouts of America. The arms of the cardboard scout were connected to a series of magnets permitting him to signal "Be Prepared." Although only Boy Scouts or those versed in wig-wag signals could read the message, the display attracted much attention. S. J. Gray, salesman in the Electric Shop, decorated the window, which showed the company's interest in the welfare of the community.

NEWS OF THE INDUSTRY

Edison Company to Start Work on Shaver Lake Project

Work on the Shaver Lake tunnel and conduit line, which will connect Huntington Lake, the great storage reservoir of the Southern California Edison Company in the high Sierra, with Shaver Lake, will be commenced early this winter. Starting of the actual work on the Shaver Lake project begins another important era in the Southern California Edison Company's Big Creek-San Joaquin River project, and an expenditure of about \$37,000,000 on hydroelectric development during the years intervening between the present and 1930 is contemplated.

This combination tunnel and conduit will tap Huntington Lake at the upper end of the second dam and will have a total length of about five and a third miles. The tunnel proportions will be 12 ft. in diameter with a capacity of 1,250 sec.ft. Where the route crosses Big Creek and Pitman Creek 9½-ft. steel pipe is to be used.

At Shaver Lake, an artificial reservoir with a capacity of but 6,000 acre-ft. of water, it is intended to construct a dam which will impound 139,000 acre-ft. of water and add approximately 180,000 hp. to the present generating capacity of the Big Creek-San Joaquin project. This dam will be below the present lake, and will be approximately 220 ft. thick at the base with a height of approximately 190 ft.

With the completion of the Huntington-Shaver Lake tunnel the Southern California Edison Company will have completed more than thirty miles of tunnel since it resumed active construction operations following the war.

The total expenditure for water-power construction, reservoirs, power houses, transmission lines to local centers, with the completion of the project which has just been authorized, will bring the investment of the Southern California Edison Company in its hydro program at Big Creek up to \$123,000,000.

Puget Sound Power Company Files New Rate Schedules

New tariff schedules providing for a general reduction of residential and commercial electric lighting rates throughout all cities and other territory served by the Puget Sound Power & Light Company, Seattle, were filed with the state department of public works at Olympia July 30 by H. J. Gille, general sales manager for the company. The new rates become effective Sept. 1.

Under the new schedules filed by the company, the present practice of allowing consumers a discount of 10 per cent for payment of bills before the 10th of the month in which they are received is discontinued.

In some of the cities and districts

which the company serves where the rates at present are comparatively low the slight reduction in rates effected under the new tariff is practically offset by elimination of the discount. This is true in such places as Everett in Snohomish County; Bellingham, Whatcom County, and Mount Vernon, Skagit County.

In a majority of instances the top block shows a downward trend of at least ½ cent, with rates ranging from 7½ cents for the first 60 kw-hr. to 11 cents for the first 60 kw-hr. In practically all districts affected by the new tariffs the rate remains at 3 cents per kw-hr. for consumption beyond the primary block. In practically every instance the present minimum rates are retained. In most cases the minimum rate is \$1 a month.

The new tariff schedules do not affect either Seattle or Tacoma, both of which are served by their own municipal lighting systems.

The Puget Sound Power & Light Company, according to Mr. Gille, now has a network of lines extending south from the British Columbia boundary to Woodland, in Cowlitz County. The company also has a line along the Chicago, Milwaukee & St. Paul Railway Company's line over the Cascade Mountains extending as far east as Chelan Falls.

Rehearing in Aberdeen-Wynooche River Rights Matter

Rehearing in the matter of the proposed cancellation of the water power rights of the city of Aberdeen, Wash., on the Wynooche River recently was held before R. K. Tiffany, state supervisor of hydraulics at Olympia, Wash. E. E. Bonner, city attorney, presented evidence of the progress being made by the city to maintain its rights, which it gained under a permit transferred to the city by J. E. Malinowski. The hearing followed a notice sent by former Supervisor Marvin Chase ordering the city to appear and show cause why its permit should not be canceled for failure to proceed with development as required by the permit. (Journal of Electricity, April 15, 1925, p. 297.) The city then applied for extension of its permit and the supervisor of hydraulics took the new evidence under consideration.

Active opposition to the city's development of the Wynooche comes from the Grays Harbor Railway & Light Company, which is seeking to appropriate all available water on the Wynooche for hydroelectric power purposes. The company has filed with the state department its agreement in case it acquired the power rights to permit the city to take such water as necessary for an increase to its present municipal water supply.

To Test Effect of Water Hammer on Welded Steel Penstocks

Exhaustive tests to determine the effect of water hammer upon welded steel penstock pipe are to be conducted early in September at the Milwaukee works of the O. A. Smith Corporation. The exact date of the tests will be announced later.

The tests will be made on an 8-ft. section of 50½-in. o.d. steel pipe 2 in. thick. The pipe will be welded from four longitudinal sections. Four-inch cast steel heads will be welded to the pipe section and the vessel submitted to a hydrostatic pressure of 1,000 lb. per sq. in. By means of a pump this pressure will be raised to 2,000 lb. per sq. in. and released to its original pressure at the rate of 120 times per minute. Thus an effect similar to water hammer will be set up.

Following the tests the pipe will be cut up and examination made to determine the effect of the pressure changes upon the structure of the steel. Specimens will be compared with a section cut from the pipe prior to the tests.

Engineers connected with western power companies which are contemplating high-head developments in the near future will witness the tests. Among the companies which are planning to be represented are the Southern California Edison Company, San Joaquin Light & Power Corporation, Pacific Gas and Electric Company, Feather River Power Company and the City of San Francisco. Further details regarding the tests can be secured from B. F. Bart, Pacific Coast district sales manager, A. O. Smith Corporation, 1108 Commercial Exchange Building, Los Angeles.

Present Rate of Progress on Cushman Project Expected to Make Power Available Jan. 1, 1926.—The Cushman power project of the City of Tacoma is progressing at a pace that will make power available by Jan. 1, 1926, according to the opinion of Ira S. Davisson, commissioner of light. This was the original date set for the turning of the wheels. The big dam in the Skokomish River, which is being poured in three sections across the river, is more than 120 ft. above bedrock on the lower side and more than 150 ft. on the higher, Mr. Davisson reports. The power line construction has proceeded to the point of stringing wires.

South Pasadena Street to Have Ornamental Street Lights.—The board of trustees of the City of South Pasadena, Calif., has passed a resolution declaring its intention to cause ornamental street lights to be installed on Milan Avenue from Monterey Road to Huntington Drive. Thirty-four single light standards using 250-cp. nitrogen-filled lamps are specified.



Nine-Mile plant recently purchased by The Washington Water Power Company

Washington Water Power Co. Acquires Nine-Mile Plant

The Washington Water Power Company, Spokane, recently has acquired by purchase from the Spokane & Eastern Railway & Power Company the Nine-Mile hydroelectric power plant located below Spokane on the Spokane River. Announcements of the sale were made by M. W. Birkett, general manager of The Washington Water Power Company, and W. G. Paine, vice-president and general manager of the Spokane & Eastern-Inland Railways, in Spokane, and also in Chicago by M. H. MacLean, president of the Spokane & Eastern-Inland properties.

The Nine-Mile plant, which has an installed generating capacity of 20,000 hp., consisting of four 5,000-hp. units, supplies power for the operation of the Spokane & Eastern-Inland electric trains and also furnishes a considerable amount for commercial use. According to present plans, contracts will be entered into between the power company and electric railway company whereby the former will supply power for the operation of the latter for a number of years. The present commercial business also will be retained so that the acquisition of the plant will not give the power company any additional surplus power. However, its addition to the system will bring the installed generating capacity of The Washington Water Power Company up to approximately 185,000 hp. The company now owns six plants on the Spokane River, including the Nine-Mile plant, and one on the Similkameen River near Oroville.

The disposal of the Nine-Mile power plant is in accordance with the policy of the bondholders' protective committee which acquired through foreclosure sale in 1919 the properties of the old Spokane & Inland Empire Railroad Company which had gone into the hands of a receiver through default in the payment of bond interest. The committee has been operating the properties with

a view toward the ultimate payment of all claims. It is the duty of the committee to liquidate the business as soon as possible, the first step in this direction having been the sale of the street railway lines in Spokane to the Spokane United Railways. The disposition of the Nine-Mile plant leaves the bondholders' committee in possession of certain other properties, consisting chiefly of electric railroad lines, which it is willing to sell to any railroad which can use them advantageously and pay a fair price for them, according to Mr. MacLean. In the meantime it will continue to operate them to the best of its ability.

Byllesby Company Effects House Organ Standardization

Standardization of member companies' employee publications recently was effected by the Byllesby Engineering & Management Corporation to conform with the home office external publication, the Byllesby Monthly News. Upon the Pacific Coast the plan affects the house organs of the Western States Gas & Electric Company, Stockton, Calif., and the San Diego Consolidated Gas & Electric Company.

Conforming with the spirit of the change of policy in regard to the employee magazines, the house organ "Glow," of the San Diego Consolidated Gas & Electric Company, has been changed to "The News-Meter," beginning with its July issue. The reason given for the change in name is that the standardized form of publication belongs more to a newspaper type of publication than did "Glow," which adhered to magazine type, and a new name appropriate to its changed character has been thought advisable by the staff and management.

No change in the title of "Fumes and Flashes," the employees' magazine of the Western States Gas & Electric Company, is contemplated.

L. A. Bureau of Power and Light to Build Substations

Announcement has been made by the Bureau of Power and Light of Los Angeles of a program to spend \$21,000,000 for extensions and betterments to its distribution system. Work is to begin immediately on twelve new substations to cost approximately \$2,500,000 which will have an initial installed capacity aggregating 75,000 kva. and transforming power from 33,000 to 4,400 volts. These stations will be located at important distributing centers and will have the most modern type of electrical apparatus for the relaying of energy to surrounding consumers and will make light and power service available in much larger quantities in the districts affected.

Seven of the new stations will be constructed of steel frame, finished with stucco and having concrete roofs. Four will be constructed of reinforced concrete, and all will be of the class of construction standardized by the distribution department.

Four buildings to be used as offices for foremen are to be constructed. One of these, which is to be headquarters office for all foremen, will be a two-story reinforced concrete structure occupying a space 40 x 300 ft.

During the coming year four miles of 33-kv. underground cable will be laid as well as four miles of low-voltage cable. Also fifty miles of 33-kv. overhead lines will be built, all of which will require the purchase of large quantities of line equipment.

Report Recommends Disposition of Logan Municipal Plant

Recommendation that the city of Logan, Utah, dispose of its municipal electric light plant and that steps be taken at once to submit to the people a proposition for disposition of the plant has been made by the special electric light plant committee of the Logan Chamber of Commerce to the Chamber's board of directors.

The report, submitted after several months of investigation, states that the conditions under which the plant is operating are "decidedly uneconomic," and adds: "In order to continue under such conditions the tax levy from year to year will be an excessive burden on the people, and will inflict penalties upon taxpayers that will, in all probability, fail to stand the test of law should the matter be submitted to the courts." Large sums will be needed to keep the plant in repair, according to the report, and it is not believed feasible to increase the capacity of the plant or to eliminate the competition now offered by the Utah Power & Light Company. The conclusion of the committee is to the effect that it will be cheaper for residents to purchase power from private companies rather than to continue as at present with the flat rate or to go on meters.

Smithsonian Institution Publishes Report.—The annual report of the board of regents of The Smithsonian Institution recently has been published. It shows the operations, expenditures, and condition of the institution for the year ending June 30, 1923. It contains much interesting information and is illustrated with numerous drawings, plates and charts.

Data on Operation of Twelve Largest California Electric Utilities

Figures on the operation of California electric utilities compiled by Lester S. Ready, chief engineer of the California State Railroad Commission, at the request of Paul S. Clapp, assistant to Herbert S. Hoover, show that the approximate rate base of the twelve largest utilities for 1924 was \$441,358,000. In 1923 this rate base was \$369,455,000, and in 1922, \$328,095,000. The twelve companies included in this total represent approximately 97 per cent of the total electric utility business of the state. It is estimated that the increase

in the rate base for 1925 will be approximately \$90,000,000, bringing the total at the end of that year up to \$535,000,000.

In the accompanying table, which was compiled from data supplied to Mr. Clapp and from the annual reports of the various utilities, some interesting statistics on the operations of the electric utilities are divulged. Data on the rate base, gross revenue and taxes are taken from the report to Mr. Clapp. The other figures are taken from the annual reports of the utilities.

Earnings Basis—California Electric Utilities, Twelve Largest Companies			
	1922	1923	1924
Gross revenue (electric operations).....	\$ 66,203,598	\$ 72,060,576	\$ 80,115,257
Expenses:			
Operating expenses	25,920,005	27,816,875	35,929,747
Taxes	6,386,563	7,091,794	6,954,131
Uncollectible bills	198,500	216,100	240,300
Depreciation annuity	4,530,000	5,180,000	6,080,000
Total deductions	\$ 37,035,068	\$ 40,304,769	\$ 49,204,178
Net for return (available for interest, sinking funds, dividends and surplus).....	29,168,530	31,755,807	30,911,079
Approximate rate base (estimated by Chief Engineer of Commission from Commission decisions).....	328,095,000	369,455,000	441,358,000
Per cent of return on approximate rate base (reasonable cost of operative properties).....	8.89%	8.61%	7.01%

Colorado River Placer Claimants Sued in Nevada by U. S.

Complaint was filed July 28 in the office of the clerk of the United States court for the Nevada district by George Springmeyer, United States attorney, against twenty-three individuals and an injunction asked to prevent them from further claiming or occupying sixty asserted placer mining claims and three asserted load claims that lie along the Colorado River in Clark County, Nevada, according to recent press dispatches. These claims extend for about twenty-five miles, taking in the Upper Black Canyon, Callville and Boulder Canyon storage and power dam sites and the reservoirs above each.

The government contends that, in general, the lands in question were not subject to entry, having been withdrawn; that, prior to the date of final effective withdrawal, the defendants made no discovery of valuable deposits on the claims in "quantity or grade sufficient to induce any reasonable person to prosecute further work"; and that the defendants sought possession of "the said pretended groups of mining claims under the guise and pretext that they were bonafide mineral locations, for the purpose of utilizing the water and power resources of said Colorado River and the storage reservoirs and power dam sites adjacent thereto and on the adjoining lands..."

The suit is said to be similar to one already filed in Arizona covering fifty five claims recorded in that state.

Application Filed for Permit to Build 11,000-Volt Transmission Line.—H. G. Kumle and Charles R. Rosebaum of LeGrange, Calif., have applied to the Federal Power Commission for a license to cover a transmission line, a portion of which is in the Tahoe National Forest. It is proposed to build the transmission line from the Bullards Bar power plant of the Yuba Power Company, a distance of 3.86 miles, to the mining property of the applicants. The line is to carry 11,000 volts.

New Hydro Plant Put on Line by West Kootenay Company

Bringing the capacity of the Bonnington Falls installations of the West Kootenay Power & Light Company to a total of 72,000 hp., the Lower Bonnington Falls plant of the company was put on the lines Aug. 3. Two 20,000-hp. hydro units geared directly to two Canadian General Electric Company generators are installed in the new plant. Provisions for a third unit of similar capacity are made in the plant and will be added when the power is needed.

The opening ceremonies were attended by about five hundred guests consisting of business and civic leaders from the districts served by the company. Following the starting of the new plant by T. H. Pattullo, minister of lands for British Columbia, the guests were entertained at a banquet and dance.

The West Kootenay company serves a number of communities in the vicinity of Trail, B. C., and Northport, Wash. Power also is supplied to the smelter of the Consolidated Mining & Smelter Company of Canada at Trail and the mine and mill of the Allenby Copper Corporation near Princeton.

Reduction in Power Rates Sought by Oakland, Calif.

The city council of Oakland, Calif., on Aug. 5 instructed the city attorney to institute proceedings before the California State Railroad Commission for the purpose of securing a reduction in the power rates charged by the Pacific Gas and Electric Company and the Great Western Power Company.

Figures presented by the city attorney were claimed to show that the business of the companies in the East Bay district had increased 46 per cent since 1922, that the number of consumers had grown from 84,000 to 104,000, and that the percentage of increase in operating expenses has been low.

Series of Inspirational Meetings Held by Appliance Company

To bring about a better understanding of the merits of the Hotpoint line of ranges, water heaters and cookers among central station salesmen, the Edison Electric Appliance Company, Inc., through P. H. Booth, district manager, is conducting a series of inspirational meetings throughout the northern section of California. The first of these meetings, held before a number of officers, department heads and salesmen of the Great Western Power Company and the Pacific Coast jobbers for the Edison company, the Pacific States Electric Company, was conducted at the Palace Hotel, San Francisco, on Aug. 10.

Mr. Booth presided at the meeting and introduced as the first speaker Miss Galvin, home economist, who spoke instructively on the range from the woman's standpoint and brought out such items of sales resistance usually encountered by the salesman in dealing with the housewife. She was followed by J. C. Douglas, manager of the San Francisco district, who discussed the features of the water heater, the cooker, and the economic characteristics of the Hotpoint electric range. Mr. Booth then introduced R. W. Turnbull, who is in charge of the Edison company interests in the Northwest. Mr. Turnbull's address was easily the feature of the evening. For an hour he held the concentrated attention of the audience in presenting the story of the development of the Hotpoint range, a discussion of its structural features, and its selling points.

D. E. Harris, vice-president of the Pacific States Electric Company, spoke briefly of the desire on the part of his company to lend its hearty cooperation toward increasing range sales and said that instructions to his salesmen had been issued to this effect. R. E. Tompkins, range specialist for the same company, seconded Mr. Harris' statement. Mr. Booth then presented some of his company's sales literature, prepared for the aid and guidance of the salesman, including a bound portfolio of photographs showing Hotpoint products. George Cole, heavy-duty range salesman, then spoke of the difference in sales methods required for hotel and restaurant sales. The evening's entertainment closed with brief addresses from Messrs. Woodward, Sharon, Wrenn and Sanford, all of the Great Western Power Company.

Fire Results in Damage Suits Against Power Company.—Suits asking damages totaling \$902,592 have been filed against the Great Western Power Company of California by the California Wharf & Warehouse Company and Balfour-Guthrie Company as the result of losses incurred Sept. 13, 1924, when a fire destroyed the warehouse company's storage plant at Port Costa, Calif., and more than 9,000 tons of grain belonging to Balfour-Guthrie Company and others. Charges are made that the fire was started by transformers in the transformer room of the warehouse, that the transformers were in poor condition, and that carelessness caused them to catch fire. The power company, after investigation, denies any responsibility as to the damage having been caused by the transformers.

Large Power Project Planned for Cowlitz River, Washington

Indicating unusual activity in proposed power development on the Cowlitz River in Lewis County, Wash., four applications to appropriate water and two applications to construct reservoirs, all for hydroelectric purposes, have been recently filed with R. K. Tiffany, state supervisor of hydraulics.

The two applications to construct reservoirs and three of the applications to appropriate water were filed by H. W. Crozier, who gave his address as being in care of the Cowlitz, Chehalis & Cascade Railway, Savings and Loan Building, Chehalis. The applications are for units of a \$1,500,000 power project, he said. The three water applications are identical in nature and cover three units of a great plan for the development of the Cowlitz River, according to Mr. Crozier, these units to be known, respectively, as Mayfield, Mossy Rock and Big Bend.

Each application covers the appropriation of 1,650 sec.ft. of water from the Cowlitz River for the development of electricity for lighting, cooking and other domestic purposes and for the development of power. Construction involved includes a pipe line two miles long. The diversion dams are to be of the arched cyclopean concrete form of overfall type, with steel headgates. The dams are to develop 16,110 hp. The total fall to be utilized is 130 ft. gross, 123 ft. net. The dams are to be 135 ft. high, 200 ft. long on top and 50 ft. long on the bottom. Power is to be developed by a dam 135 ft. high, 105 ft. over water level, according to Crozier, who adds that 11,000 ft. of 13-ft. 6-in. wood stave pipe are to be utilized in the construction program. A concrete power house with a 17,000-kw. capacity is to be built.

The three plants are to have a total capacity of 54,000 kw. The storage capacity of the two lower plants of the project, Mayfield and Mossy Rock, will be utilized, Crozier explained, to augment the lack of storage in the Big Bend unit and thereby permit conservation of the maximum power which may be realized between the intake of the Mossy Rock unit just below the confluence of the Cispus River and the discharge of the Mayfield unit at the end of Mayfield Canyon.

Both reservoir applications are for the storage of 25,000 acre-ft. of water to be taken from the Cowlitz River. An overfall waterway over the dam, supplemented by additional spillways for each side of the dam, is to be utilized. The areas to be submerged when the reservoirs are full is 640 acres. The reservoirs are to have a maximum depth of 120 ft., with an approximate mean depth of 70 ft.

Construction of the reservoirs is to begin about one year after the completion of the power plants proper and will be finished within eighteen months after it begins, according to the applications.

The sixth application, which is for an unspecified amount of water from the Cowlitz River for hydroelectric purposes, was filed by J. G. Kelley, 7 East 16th Street North, Portland. The project proposes to develop 54,545 hp., according to the application. Construction costs are not given. The diversion dam is to be 80 ft. high and power is to be developed at a fall of 80 ft. A

masonry dam and power house are to be built. Mr. Kelley requested that the application be held in abeyance for a reasonable length of time to permit him to make necessary surveys and maps for completing his application. Additional construction details are not given.

Two Street-Lighting Contracts Signed in San Diego

Contracts for two new ornamental lighting districts in downtown San Diego, Calif., were awarded recently and work is progressing on the installation of the units, adding to the area recently lighted by new systems and replacing old equipment with newer and more efficient equipment in another instance.

Martin & Walker were awarded the contract to replace the old-fashioned lighting standards that for years have illuminated Sixth Street, between B and F Streets. The district now will be lighted by 64 new lamps of 600 candle-power each set on metal standards. Two lamps will be mounted on each post.

The second district to be contracted for is a new district, providing for 160 single standards of metal on Eighth, Ninth, Tenth, Eleventh and Twelfth Streets from Broadway to Market Streets. Each standard will be mounted with a 600 candle-power lamp, and, as in the other district, the glassware will be of ripple glass with dome reflectors. The Globe Electric Company of San Diego was awarded the contract for this work.

Impressed by the complete illumination provided in the recent installations east of Sixth Street, the districts west of this street at present are contemplating similar installations. Suburban districts both within the city limits and in the back country about San Diego likewise are planning extensive street-lighting activity.

Work on Test Arch Dam to Be Begun in October

Work is expected to begin in October on the test dam to be erected by a research committee of Engineering Foundation for the purpose of investigating questions of strength of arch dams, according to a statement made by the Foundation. Work on the foundation of the dam already has been begun.

The dam, which is situated on Stevenson Creek, a tributary of the San Joaquin River, about 60 miles east of Fresno, Calif., will be built first to a height of 60 ft. above the bottom of the foundation. Later, after preliminary tests have been made, it will be increased to a total height of 100 ft. The upstream radius of curvature will be 100 ft. and the thickness 2 ft. from the 30-ft. level to the top, while the lower part will splay out to a base thickness of 7 ft. 5 in.

B. C. Company Completes Fifth Unit of Stave Falls Plant

The fifth unit of the Stave Falls plant of the British Columbia Electric Railway Company, Ltd., Vancouver, B. C., has been completed. The addition of this 25,000-hp. unit completes the enlargement of the Stave Falls plant, which now has a total capacity of 75,000 hp.

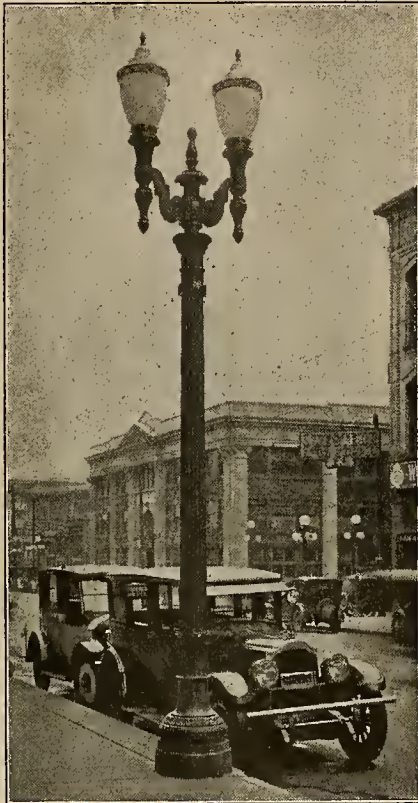
The plant, originally built by the Western Power Company, consisted of three units with a capacity of 39,000 hp. when it was taken over by the British Columbia Electric Railway Company at the end of 1920. The latter installed a fourth unit bringing the plant's capacity up to 52,000 hp., and almost immediately took steps to increase its capacity still further by planning a fifth unit, now just completed. The total cost of the enlargement of the Stave Falls plant is estimated at \$2,500,000.



Members of the advisory board of the Electrical Cooperative League of Denver and visitors at a recent meeting of the organization. Top row, left to right—C. W. Kaylor, Westinghouse Electric & Manufacturing Company; E. C. Headrick, electrician; A. E. Bacon, Mine & Smelter Supply Company; R. G. Gentry, Public Service Company; W. R. Kaffer, Electric Supply & Construction Company; J. C. Davidson, Hendrie & Bolthoff Manufacturing & Supply Company; Clarence Keeler, Public Service Company; and L. B. Johnson, General Electric Company, Salt Lake City. Middle row—F. L. Easton, Economy Fuse Company; Dean D. Clark, League treasurer, Mountain States Telephone & Telegraph Company; A. C. Cornell, League chairman, Western Electric Company; Thomas W. Nixon, Denver Electrical Contractors Association; E. A. Scott, League secretary, Scott Bros. Electric Company; W. A. J. Guscott, League vice-chairman (contractors), electrician; F. F. McCammon, League vice-chairman (utilities), Public Service Company. Bottom row—George Bakewell, Jr., field representative; O. L. Mackell, Public Service Company; Ernest P. Kipp, League vice-chairman (manufacturers), Hazard Manufacturing Company; John J. Cooper, Mountain Electric Company; B. C. Watts, B. C. Watts & Company; and S. W. Bishop, executive manager of the League.

Portland Embarks on Ornamental Street-Lighting Plan

On a bid of \$118,876.69 the Portland Electric Power Company was awarded the contract for ornamental post lighting of the newly created lighting district embracing seventeen blocks on Broadway between Hoyt and Jefferson Streets, in Portland. The figure, which was approximately \$2,000 less than the competitive bid of the Northwestern Electric Company, covers labor and material of installation, and operation and maintenance for five years. The lighting district, which includes one of the principal retail business and theater streets of the city, was established under a recent amendment to the city charter permitting the formation of such improvement districts by petition of fifty per cent of the property owners,



New type of street lighting unit being installed in Portland

and the assessing of the cost against the abutting property on a five-year bonding basis.

The unit determined upon by the city council, acquiescing in the demand of a majority of the property owners involved, was a Union Metal, pressed steel standard, with two General Electric Company Novalux units with medium alabaster rippled globe and canopy. Each unit will contain a 20-amp. Mazda high-efficiency series street-lighting lamp of 15,000 lumens rating, and the standards will be set six to a block, three on each side of the street, making a total of 106. This equipment thus arranged will give an average intensity on the pavement of 2.85 foot-candles, and 665 lumens per linear foot of street. On the basis of lumens per linear foot, this street will be the fourth best-lighted street in the United States, the three better being Main Street, Salt Lake City, with 822 lumens; Market Street, San Francisco,

with 750 lumens; and Erie Boulevard, Schenectady, with 700 lumens.

The plans of the power company for serving this equipment call for the installation of six series-circuits of parkway cable, each supplied from a 40-kw., 6.6-amp., subway-type, constant-current transformer. In the base of each post will be a 6.6 to 20-amp. series, ornamental-post transformer, double-wound for two secondary circuits.

It is understood that the equipment specified for this lighting district will be made standard for the downtown street lighting of the city, with the same type of architectural design in single units and smaller sizes for the secondary business streets and residence districts. Other lighting districts in the process of formation are Washington, Morrison, Sixth and Fifth Streets.

Pulley Manufacturer Appoints San Francisco Agent

In connection with its program of providing adequate distribution of its products and full service for motor manufacturers, distributors and dealers, the Rockwood Manufacturing Company, Indianapolis, Ind., has announced the establishment of a Rockwood Paper Pulley Store in San Francisco with the Buzzell Electric Works, 532 Sansome Street, as agents.

The plan of establishing distributing points throughout the country was evolved in order to meet the demands of the motor trade for adequate servicing facilities for pulleys. Price standardization was another factor.

Rockwood Paper Pulley Stores, Inc., the distributing agency for the Rockwood Manufacturing Company, now has branches in Denver, Salt Lake City, Los Angeles, Seattle and San Francisco. In Denver Hendrie & Bolthoff are the agents; in Salt Lake the Capitol Electric Company; in Los Angeles the Illinois Electric Company; and in Seattle, the Seattle Hardware Company.

The San Francisco branch was established by William D. Hamerstadt, general manager of the Rockwood Manufacturing Company, who came to the Coast for that purpose.

Small Power Development Contemplated on Salt River in Arizona.—Charles A. Johnson, of Lakeside, Ariz., has applied for a preliminary permit covering a small power development in Salt River twenty miles north of Globe. He proposes to erect a concrete diversion dam 15 ft. high near Hess Creek. Five hundred sec.ft. of water is to be diverted through a 7-mile tunnel and one-fourth mile of steel pressure pipe to a power house. The power is intended for use in the Globe and Miami mining districts.

Wilbur, Wash., Claims Record in Range Saturation.—A record in electric range saturation for a town of about 1,000 population is claimed for Wilbur, Wash., by John Barnes, district agent for The Washington Water Power Company, which serves the town. With 125 ranges placed among the 230 residential customers of the company a saturation of 54 per cent has been reached. Other smaller communities on the system of The Washington Water Power Company have a higher percentage, but it is believed that Wilbur's total is a record for towns in its class.

Annual Stockholders' Report Issued by Westinghouse

The annual report of the Westinghouse Electric & Manufacturing Company and its proprietary companies for the fiscal year ended March 31, 1925, recently was made public. It shows gross earnings from sales billed of \$157,880,291.87. Cost of sales, including factory cost, which covers all expenditures for patterns, dies and new small tools and sundry other betterments and extensions; also depreciation of property and plant, inventory adjustments and depreciation; all selling, administration, general and development expenses; and taxes, is given as \$144,242,065.10, leaving a net manufacturing profit of \$13,638,226.77. Gross income from all sources amounted to \$17,841,406.19, and net income to \$15,324,364.36. These amounts for the year 1924, in the order named, were: \$154,412,918, \$147,006,280, \$17,406,638, \$18,743,076, and \$16,125,303. The decrease in net income for 1925 as compared with 1924 amounted to \$800,939.

The report states that the decrease in the total value of all orders booked was 5 per cent as compared with the previous year. Orders for incandescent lamps and radio apparatus substantially exceeded last year. The value of unfilled orders at the close of the fiscal year was \$55,271,908 as compared with \$63,738,702 of the year previous.

With the ultimate view of retaining at East Pittsburgh mainly the manufacture of heavy machinery such as electric locomotives, large generators and motors, and similar equipment, a number of important additions to and rearrangements of its manufacturing facilities were made. The expense of these rearrangements and changes has been included in the operating costs for the year. Also included in these costs is the expense of the redesigning of certain important lines of product, notably steam turbine and large circuit breakers.

The report reviews the company's social and financial welfare work carried on in the interest of its employees. This includes a group insurance plan, under which approximately 35,000 employees now are insured for \$500 each, and approximately 19,000 of whom have additional insurance in varying amounts, the total group insurance now carried amounting to \$32,160,000. Other branches of the welfare work covers housing operations, by which the company has erected on land adjacent to its different works 451 houses and sold them at cost to employees on terms of 10 per cent down and one per cent a month; educational facilities, scholarships, and a pension system.

Priest Rapids Power Market to Be Assured Before Work Starts.—Work on the proposed Priest Rapids hydroelectric power project on the Columbia River in Washington will not be started until a market for the power is assured, according to a recent statement made in Seattle by S. Z. Mitchell, president of the Electric Bond & Share Company of New York. His company through its various holdings is interested in the Washington Irrigation & Development Company, which holds the permit for the Priest Rapids development. Mr. Mitchell stated that Henry J. Pierce of Seattle is now in Germany investigating methods of creating a sufficient demand for the power to be generated.

New Hydroelectric Unit to Be Built at Mormon Flat Dam

Money to be used in the construction of the first of two 10,000-hp. hydroelectric units at the Mormon Flat Dam on Salt River will be advanced to the Salt River Valley Water Users Association by the Central Arizona Light & Power Company of Phoenix. Under the contract the loan of \$410,000 is to carry an interest rate of 6 per cent and is to be entirely refunded in twenty-five years. It is expected to have the proposed new unit in operation in the spring of 1926.

The output from this new plant is to be sold at 8½ mills per kw-hr. to the Central Arizona Light & Power Company, which contemplates spending approximately \$200,000 in the city of Phoenix to handle the distribution of this additional current.

Edison Company Issues Earnings Statement for Six Months

Earnings statement of the Southern California Edison Company for the first six months of the year shows a remarkable improvement in the general prosperity of the company over the same period last year.

After providing for depreciation, earnings for the first six months are, on an annual basis, in excess of \$12 per share of common stock outstanding June 30, 1925, as compared with an earning of \$3.55 for 1924.

This increase in earnings is ascribed to the fact that practically all of the energy sold this year has been generated by hydroelectric plants, whereas last year the water shortage made necessary the use of a large number of rejuvenated steam plants. With the completion of the 13½-mile Florence Lake tunnel on the Big Creek-San Joaquin project this spring, it is said that all danger from future droughts has been eliminated completely.

Total operating revenue of the company for the past six months was \$11,545,881 with operating expenses of \$4,048,866. Operating revenue for June totaled \$2,167,733 and operating expense was \$595,995. Balance for depreciation and surplus for the six months' period amounted to \$5,258,058 as compared with \$2,391,679 for the corresponding period last year. Balance for depreciation and surplus in June totaled \$1,202,045.

Dealers Cooperate with Utility in Iron Sales Drive

An electric iron campaign, utilizing the new Westinghouse automatic iron, is following upon the heels of the recent kitchen-lighting-unit campaign in the San Diego territory. Instead of the power company sending out salesmen, however, this campaign is to be one conducted by the central station on behalf of the dealers.

One hundred per cent cooperation has been given the power company, the San Diego Consolidated Gas & Electric Company, in the stocking and display of this special iron in connection with the campaign. All electrical dealers in San Diego County, Calif., as well as the branch offices of the company, have some of these irons on hand.

An extensive advertising campaign started June 15 in every paper in the county, combined with direct-mail cir-

cularizing. The thermostatic feature of the iron, tying in with the advertising slogan in connection with it, is being especially emphasized.

A credit of a dollar for each old iron turned in for the new iron, is also advertised. Emphasis is being placed in the advertising that the new irons may be purchased from any electrical dealer. A list of the dealers and their addresses is also to be displayed prominently.

Perfect dealer cooperation in this drive is attributed to the success of the kitchen-lighting campaign and the results gained from it.

Advertisers Association Appoints Chairmen for Convention

Appointment of chairmen for important committees featured progress made in the last week in the development of plans for the convention of the National Industrial Advertisers Association to be held at the Chalfonte Hotel, Atlantic City, Oct. 19, 20, and 21.

One new appointment was that of J. N. McDonald of the Anaconda Copper Mining Company, New York, incoming president of the Technical Publicity Association, to be chairman of the On-to-Atlantic City Committee. Other chairmen named are D. J. Benoliel of the International Chemical Company, Philadelphia, to head the exhibit committee; Hoyt Catlin of the Bryant Electric Company, Bridgeport, to head the entertainment committee, and H. J. Downes of the American Locomotive Company, New York, to head the transportation committee.

Organization of the general committee has been completed. W. A. Wolff of the Western Electric Company, New York, is chairman. The other members are J. L. Ashcroft, Ludlow-Saylor Wire Company, St. Louis; Joseph C. Bowman, Cleveland; Ezra Clark, Clark Tractor Company, Buchanan, Mich.; O. C. Dahlman, Koehring Company, Milwaukee; W. S. Hays, National Slate Association, Philadelphia; J. N. McDonald, and A. M. Staehle, Westinghouse Electric & Manufacturing Company, East Pittsburgh.

First Unit of Big Pine Plant of Los Angeles in Operation

The Bureau of Power and Light of Los Angeles placed the first 4,000-hp. unit of its Big Pine power plant in operation July 31, one week ahead of schedule. Work on the installation was speeded up in order to be able to furnish emergency service to a number of mines and industrial plants in the Owens Valley region that were temporarily without power because of damage done to the feeder lines of The Southern Sierras Power Company during a violent electric storm and cloudburst. Power from the Big Pine power plant is to be used in pumping water from approximately 300 wells in Owens Valley into the aqueduct for the water department of the city of Los Angeles.

Jobber Salesmen Hear Details of Power Sales Program of Central Stations.—At a recent meeting of the salesmen of the Pacific States Electric Company the details of the power sales program of the Pacific Gas and Electric Company and the Great Western Power Company was explained in detail. E. F. Perkins, Hugh M. Crawford, F. H. Woodward, and John W. Wrenn spoke for the power companies. P. H. Booth of the Edison Electric Appliance Company also addressed the meeting.

Alameda to Cooperate in Range Sales Program.—Joe Kahn, of the electrical department of the City of Alameda, recently announced that arrangements had been made whereby the city would cooperate with the power companies in the range sales program now being conducted. All ranges will be sold by the electrical contractor-dealers and the furniture dealers, and the installations will be made by the electrical contractors. The installation price will be the same as that quoted by the power companies, and the city will take care of the difference in the same manner as the power companies. However, all installations will have to be made for cash as the city has no means of handling deferred payments.



As a mark of welcome to the N.E.L.A. delegates 96 Westinghouse lamp dealers in San Francisco presented special window displays during the recent convention. Representatives of the Westinghouse Lamp Company assisted in decorating the windows. Two typical displays are shown above.

Service with Company Celebrated by Westinghouse Men

A dinner to celebrate the thirty-second and twenty-eighth anniversaries of service with the Westinghouse Electric & Manufacturing Company was given to H. D. Shute, vice-president in charge of sales and C. E. Heise, manager of the Pacific central division of



H. D. SHUTE

the company, in San Francisco recently. The dinner was given by the Pacific central district sales force, about sixty men being present.

Mr. Shute, who joined the company July 1, 1893, addressed the gathering and announced the appointment of F. A. Merrich as vice-president and general manager of the company. In speaking of the growth of the company during the last thirty years he said:

We are growing so rapidly that it has become necessary to initiate a policy of decentralization of manufacturing units. Originally East Pittsburgh was our principal manufacturing location. Today we are scattering our plants over the country at advantageous points. We have already spent approximately a million dollars in the San Francisco Bay district establishing assembling and warehousing facilities here. This is a part of the decentralization program. Our selling forces, on the other hand, are being more and more unified in order that a single force may eventually represent Westinghouse before the public.

Mr. Shute also called attention to the need for a new office building at East Pittsburgh. Work on this 11-story building has been started and is to be completed within a year.



C. E. HEISE

Mr. Heise, who celebrated his twenty-eighth anniversary of service with the company, addressed the meeting, telling of some of his recollections of the electrical industry during his association with the Westinghouse company.

Survey for Los Angeles Proposed Water Supply Project

In connection with the proposed project to bring water to Los Angeles from the Colorado River, the Municipal Water Bureau of that city now has six surveying parties in the field, a construction crew building a 40-mile road into the mountains in the vicinity of Shaver's Well, and has opened divisional headquarters in the town of Beaumont, Calif., according to a report recently issued by William Mulholland, chief engineer of the bureau.

Three survey parties are stationed at Beaumont. They are covering the territory between White Water River and the Santa Ana River, the section of the aqueduct route usually referred to as the San Geronio tunnel section. A fourth survey party is collecting topographical data in the vicinity of San Bernardino, and two others are working in the San Gabriel Canyon district.

E. A. Bayley, assistant engineer of the Water Bureau, has been placed in charge of all survey work in connection with the project. The road now being constructed will have to be completed, according to Mr. Bayley, before the aqueduct engineers can penetrate into the mountainous country to make certain necessary detailed studies of the region.

Employee Bulletin of Central Station Interesting

The Great Western Power Company of California is publishing a weekly bulletin which is sent to all of its division sales managers, salesmen and employees who are members of the Pacific Coast Electrical Association. The first page of each bulletin contains a letter written by one of the executives of the company concerning a particular phase of activity with which he is most familiar.

In one of the recent issues this letter was written by F. H. Woodward, general sales manager. It contained some pertinent information regarding the range selling campaign which the company is now conducting, including some facts about the cost of operation. It stated that the average family uses from two to three times as much electricity for cooking as it does for lighting; that is, if the lighting bill is \$1.50, the cooking bill is approximately \$3.00 to \$4.50 per month.

A copy of the selling program of the company for the rest of 1925 was enclosed with this bulletin. It covered ranges, water heaters, air heaters, and other information. The regular bulletin contains additional information which is helpful and has been a great aid in building employee morale.



News of the Electragists



Who's hungry? Let's eat!

California Electragists' Convention at Eureka Highly Successful Affair

Papers on business problems of vital concern to contractor-dealers throughout California, the merchandising programs of the Pacific Gas and Electric Company and the Great Western Power Company, discussions of particular problems facing the contractors in various parts of the state, and the election of state and division officers filled the program of the annual convention of the

California Electragists held at the Eureka Inn, Eureka, Calif., Aug. 6-8. In the opinion of many of the older members as well as the younger ones this was the best convention that the contractor-dealers in California ever have held.

The session of the executive committee was held Thursday morning Aug. 6. The general open meeting was held

Thursday afternoon with Victor Lemoge, in the chair. C. J. Geisbush, executive secretary of the southern division of the California Electragists, discussed the activities of the southern division. He emphasized the importance of members using better methods of estimating and told of the methods used in teaching the Electragists' system of estimating to the members of the southern division. He spoke of the recently organized merchandising section which they are trying out. Mr. Geisbush also outlined some of the future plans of the southern division. George Eldridge, newly appointed field secretary of the northern division, next was introduced by Victor Lemoge.

C. B. Kenney, of San Francisco, reported on the work of the northern division of the association. He explained in detail the operation of the San Francisco association and urged other localities to install similar systems. He stated that the future plans of the California Electragists included quarterly meetings of executive committeemen from all over the state.

E. Earl Browne, manager of the Electrical Contractors and Dealers' Association of San Francisco, discussed the cooperation of the San Francisco asso-



The Humboldt County Electragists, the real entertainers who made the arrangements for the successful convention of the California Electragists.

gists, International. Clyde Chamblin, San Francisco, discussed the Red Seal Plan, which will provide a national standard of adequate electric wiring in the home.

H. H. Courtright, of Fresno, read an interesting paper, "The Future of the Electrical Industry As I See It." This not only outlined the probable development as seen by Mr. Courtright, but quoted numerous well known authorities to substantiate his predictions. Merchandising programs of the Pacific Gas and Electric Company and the Great Western Power Company proved to be one of the interesting topics at the meeting, for these programs effect every contractor-dealer in the state as well as the members of all other branches of the industry. These plans were discussed by H. M. Crawford, sales manager of the Pacific Gas and Electric Company, and J. W. Wrenn, assistant sales manager of the Great Western Power Company, both of San Francisco.

Active Members Hold Meeting

Active members only were admitted to the meeting held Thursday night. H. H. Walker of Los Angeles was elected president of the California Electragists. He will retain his present position as chairman of the southern division. C. F. Butte, of San Francisco, was elected state vice-president and chairman of the northern division. Edward Martin of San Francisco, was elected secretary of the northern division.

The state executive committeemen from the northern division are: C. F. Butte, Edward Martin, Victor Lemoge, Clyde L. Chamblin, all of San Francisco, and H. H. Courtright, Fresno. The state executive committeemen from the southern division are: H. H. Walker and F. E. Elser, both of Los Angeles; Frank McGinley, Wilmington; J. J. Farley, Fullerton, and J. F. Zwiener, San Diego.

Reports were received from various district committeemen at this meeting, and subjects of general interest also were discussed by members. The meeting went on record as favoring the following meetings for all future conventions: executive committee, general open meeting, and a meeting for active members only.

The entertainment provided the delegates was especially interesting. Thursday afternoon the ladies were taken on an automobile tour up the coast as guests of the Arcata Chamber of Commerce. Friday morning the delegates and their wives visited the electric mill of the Dolbeer & Carson Lumber Company. The plant is operated entirely by electricity, and the Electragists received many valuable pointers after noting the various phases of the mill system. At eleven o'clock the del-



George Eldridge, newly appointed field secretary of the northern division of the California Electragists, entered the electrical industry in 1910 as an electrician for the Pacific Fire Extinguisher Company in San Francisco in the building construction department. Mr. Eldridge has had a great deal of practical electrical construction experience. He also has had experience in central station work with the Pacific Gas and Electric Company, Oakland, in the construction department and also in the field accounting department. He was also in the commercial department as a salesman. Prior to accepting his present position, he was in charge of the Frank Electric Company, a contracting company in Hayward, Calif. His practical construction experience together with his sales, accounting and managerial experience, fit him admirably for his new work.

ciation with the city electrical department and the electrical inspectors' association of California. He urged all members to cooperate with the inspectors' association and also to become members of it. Mr. Browne emphasized the importance of the trade distribution policy of Joseph A. Fowler, president of the Association of Electra-



Fred Sundburg, who pitched the Electragists to victory.

legates left in automobiles and buses for the site of the Holmes-Eureka Lumber Company's logging operations near Carlotta. Shortly after noon they sat down to a lumber jacks' dinner served in the camp cookhouse. The afternoon visit to the woods was considered by many of the Electragists as one of the most enjoyable incidents of the convention. This was made from the camp on



E. B. Team, formerly of the A-C Electric Company of Los Angeles, who recently has become field representative of the Electrical Contractors and Dealers Association of that city. He has had considerable experience as a contractor and was always active in the work of the association.

a logging train to a point where the high-lead logging could be viewed to advantage.

Saturday Devoted to Sports and Banquet

The ball was held Friday night. Golf enthusiasts of the convention held their Country Club Saturday morning. At noon the delegates were served lunch

at Sequoia Park as guests of the Eureka Chamber of Commerce. Shortly afterwards the baseball game between jobbers and manufacturers and the Electragists was held. The Electragists redeemed themselves in a splendid manner after their defeat at Santa Cruz last year by easily winning the game.

The three-day convention was concluded Saturday night with a banquet at the Eureka Inn. Victor Lemoge, retiring president of the California Electragists, thanked the Chamber of Commerce, the merchants, the newspapers,



Oh Eddie!

tournament at the Humboldt Golf and the employees of the Hotel Vance and the Eureka Inn and the officials of the plants that were visited for the welcome and general hospitality that had been accorded the delegates. Arthur Dahl, chairman of the golf committee, presented the Manning-Bowman trophy for the ladies to Mrs. C. B. Kenney, and the East Bay Electragists' trophy to L. Siebert. C. B. Kenney, captain of the Electragists' baseball team, gave credit for the winning of the game to the Electragists of Humboldt County.

Dancing was enjoyed during the remainder of the evening.

The welcome and hospitality of the Electragists and other people of Eureka and Humboldt County were an outstanding feature of the convention and its success was due largely to their efforts.

C. V. Schneider, of the Electrical Supply Company, Sacramento, Calif., recently has sold his retail business to H. W. Faig of the Watkins Electric Company, Vallejo. Mr. Schneider and his son Lawrence will continue to engage in electrical contracting with headquarters at 2710 H Street. Frank Sieke has charge of the Sacramento store for Mr. Faig.

Marsden Radio & Electric Company, formerly at 265 Sherman Way, Van Nuys, Calif., has moved into a new store at 255 Sherman Way. In his new location Mr. Marsden has doubled his floor space.

Hubbard-Dilworth Electric Company recently opened an establishment at 1667 East Colorado Street, Pasadena, Calif. H. B. Hubbard and H. E. Dilworth are the proprietors.

The Slater Electric Company, Oakland, has moved from 493 42nd Street to 569 19th street in that city.

Book Reviews

PHYSICS IN INDUSTRY VOLUME TWO

Lectures delivered before the Institute of Physics by J. W. MELLOR, D. Sc., Principal of the Central School of Science and Technology, Stoke-on-Trent; A. E. OXLEY, D. Sc., F. Inst. P., Physicist to the British Cotton Industry Research Association; and C. H. DESCH, D. Sc., Ph. D., F. R. S., F. I. C., F. Inst. P., Professor of Metallurgy, Sheffield University. Foreword by The Hon. Sir Chas. A. Parsons, K. C. B., LL. D., F. R. S., President Inst. P. 48 pages, 12 illustrations. \$1. Published by Oxford University Press American Branch, New York.

This work comprises three separate lectures, Nos. 4, 5 and 6, and is, of course, the logical follower of volume one.

Lecture No. 4 deals with the applications of physics to the ceramic industries. In this discussion the author omits those applications of physics that are common to the other industries. Many problems of the industry are simplified greatly through the intelligent application of physics and physical phenomena.

The ramifications of physics and the physicist in the textile industry are treated at length in lecture No. 5. All twelve of the illustrations are part of this discussion. Practically everything from raw cotton to finished cloth, including the machines, is touched upon by the author in attempting to show the many opportunities for the physicist in the industry.

The conscious application of physical laws and methods to the practice of metallurgy and the wide scope of research and application necessary at the present day to meet the demands of rapid engineering progress are interestingly dealt with by the author in lecture No. 6.



All aboard for the woods!

Meetings

Programs Announced for Seattle A.I.E.E. Convention

Approval by the national papers and meetings committee of the American Institute of Electric Engineers of the subjects for discussion at the Pacific Coast convention of the Institute to be held in Seattle, Sept. 15-20, 1925, (Journal of Electricity, April 15, 1925, p. 305) has been received by the local papers and meetings committee, and the official program for this convention is announced by C. E. Magnusson, dean of the college of engineering, University of Washington, Seattle, chairman of the local committee. The complete technical and entertainment program follows:

Tuesday morning—Sept. 15, 10:30-12:30.

Address of welcome—Dr. Henry Suzzalo, president of the University of Washington.
President's address—Dr. M. I. Pupin, president of the American Institute of Electrical Engineers.
Reports of committees, etc.

Tuesday afternoon—Sept. 15, 2:00 to 5:00 p.m.

Symposium on hydroelectric power development in Pacific Northwest.

- (a) "The Baker River Power Development"—W. D. Shannon, Stone & Webster, Inc.
- (b) "The Lake Cushman Dam"—B. E. Torpen, City of Tacoma.
- (c) "The Oak Grove Development"—H. A. Rands, Portland Electric Power Company.
- (d) "Waterpower Development of the Alouette-Stave-Ruskin Group of the British Columbia Electric Railway Company, Ltd."—E. E. Carpenter, British Columbia Electric Railway Company, Ltd.
- (e) "Steam Power in its Relation to the Development of Waterpower"—R. C. Powell, Pacific Gas and Electric Company.

Tuesday evening—Sept. 15, 8:30 p.m.

President's reception, Italian room, Olympic Hotel. Dancing.

Wednesday morning—Sept. 16, 9:30 to 12:00.

Engineering Education and Research

- (a) "Some New Features and Improvements on the High-Voltage Wattmeter"—J. S. Carroll, Stanford University.
- (b) "A Stationary Type of Laboratory Standard Wattmeter"—H. V. Carpenter, Washington State College.
- (c) "On the Nature of Corona Loss"—J. J. Hesselmeier and J. K. Kostko, Stanford University.
- (d) "The Study of Ions and Electrons for Electrical Engineers"—Harris J. Ryan, Stanford University.
- (e) "Engineering Research—A Vital Factor in Engineering Education"—C. E. Magnusson, University of Washington.
- (f) "Relation Between Engineering Education and Engineering Research"—R. W. Sorensen, California Institute of Technology.

Wednesday afternoon—Sept. 16.

1 p.m.—Several of the beautiful golf courses in the vicinity of Seattle will be available to members and their friends.

Tournament play at the Inglewood Golf and Country Club for the John B. Fiske Cup. This tournament will be open to any member of a Pacific Coast Section.

2:30 p.m.—Entertainment for the ladies.

Bridge tea.
Seattle Yacht Club—Montlake Park.
During the afternoon the "K-B" boat will be on exhibition.

Wednesday evening—Sept. 16, 8:00 p.m.

- (a) "Application of Electric Propulsion to Double-Ended Ferry Boats"—Alexander Kennedy and F. V. Smith, General Electric Company.
- (b) "Lecture—"The K-B Propeller"—F. K. Kirsten, University of Washington.

Thursday morning—Sept. 17, 9:30 to 12:30.

Transmission Line Design and Operation

- (a) "Stored Mechanical Energy in Transmission Systems"—J. P. Jollyman, Pacific Gas and Electric Company.
- (b) "Spans Having Supports at Unequal Elevation"—G. S. Smith, University of Washington.

(c) "The Long Span Across the Narrows at Tacoma"—A. F. Darland and J. V. Gongwer, City of Tacoma.

(d) "220-kv. Transmission Transients and Flashovers"—R. J. C. Wood, Southern California Edison Company.

(e) "The Line of Maximum Economy"—E. A. Leew and F. K. Kirsten, University of Washington.

12:30 to 2:00—Luncheon. Sections and Branches Committee Meeting

Thursday afternoon—Sept. 17, 2:00 to 5:00 p.m.

1. Transmission Line Design and Operation (continued).

(f) "Fundamental Considerations Regarding Power Limits of Transmission Systems"—R. E. Doherty and H. H. Dewey, General Electric Company.

(g) "Analytical Discussion of Some Factors Entering into the Problem of Transmission Line Stability"—C. L. G. Fortescue and F. C. Hanker, Westinghouse Electric & Manufacturing Company.

2. Symposium on Distribution Practice

(a) "Distribution Line Practice of the San Joaquin Light & Power Corporation"—L. J. Moore and H. S. Minor, San Joaquin Light & Power Corporation.

(b) "Improvement in Distribution Methods"—S. B. Hood, Northern States Power Company.

Thursday afternoon—Sept. 17, 2:00 p.m.

Entertainment for the ladies.

Sightseeing trip over Seattle scenic boulevards.

Thursday evening—Sept. 17, 8:00 p.m.

Dinner dance in the Italian Room of the Olympic Hotel for Institute members and their friends.

COMING EVENTS

Pacific Radio Exposition—

Third Annual—San Francisco, Calif.
Aug. 22-28, 1925

National Radio Exhibition—

Third Annual—Los Angeles, Calif.
Sept. 5-12, 1925

Camp Cooperation V—

Conference of representatives of local electrical leagues—Association Island Henderson Harbor, N. Y.
Sept. 8-12, 1925

Rocky Mountain Geographic Division, N.E.L.A.—

Annual Meeting—Glenwood Springs, Colo.
Sept. 14-17, 1925

American Institute of Electrical Engineers—

Pacific Coast Convention—Seattle, Wash.
Sept. 15-17, 1925

Friday morning—Sept. 18, 9:30 to 12:30.

Symposium on Distribution Practice (continued).

(c) "The 60-Cycle Distribution System of the Commonwealth Edison Company"—W. G. Kelley, Commonwealth Edison Company.

(d) "A High-Voltage Distribution System"—Glen Smith, City of Seattle Lighting department.

(e) "A Distribution System to Adequately Supply Increasing Load Densities in Residential Areas"—M. T. Crawford, Puget Sound Power & Light Company.

(f) "Distribution Practices in Southern California"—R. E. Cunningham, Southern California Edison Company.

(g) "Power Distribution and Telephone Circuits—Inductive and Physical Relations"—D. I. Cone, The Pacific Telephone and Telegraph Company, and H. M. Trueblood, American Telephone and Telegraph Company.

Friday afternoon—Sept. 18, 2:00 to 5:00 p.m.

Symposium on Distribution Practice (concluded).

(h) "Induction from Street-Lighting Circuits—Effects on Telephone Circuits"—R. G. McCurdy, American Telephone and Telegraph Company.

(i) "The Radio Interference Problem and the Power Company"—L. J. Corbett, Pacific Gas and Electric Company.

(j) "Opportunities and Problems in the Electric Distribution System"—D. K. Blake, General Electric Company.

(k) "Engineering and Economic Features of Distribution Systems Supplying Increasing Load Densities"—L. M. Applegate, General Company, and W. Brenton, Northwestern Electric Power Company.

Friday, Sept. 18, Saturday—Sept. 19.

Short trips to industrial plants, central station properties and scenic points.

Executive Committee of Northwest Association Announced

With the appointment of section chairmen and the secretary-treasurer of the Northwest Electric Light and Power Association by its president, Lewis A. Lewis, to supplement the officers elected at the annual meeting of the association in Portland, June 12, 1925 (Journal of Electricity, July 1, 1925, p. 37), the personnel of the executive committee has been completed and is announced as follows:

President—Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane; vice-president for Idaho—R. B. King, general superintendent, Idaho Power Company, Boise; vice-president for Utah—D. C. Green, vice-president and general manager, Utah Power & Light Company, Salt Lake; vice-president for Oregon—George L. Myers, assistant to the president, Pacific Power & Light Company, Portland; vice-president for Washington—Norwood W. Brockett, director of public relations, Puget Sound Power & Light Company, Seattle; vice-president for Montana—A. T. Schultz, manager, Helena Light & Railway Company, Helena; member at large—A. C. McMicken, sales manager, Portland Electric Power Company, Portland; member at large, J. I. Colwell, manager, Western Electric Company, Seattle; chairman public relations section—W. H. Ude, director of public relations, The Washington Water Power Company, Spokane; chairman Commercial Section—P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake; chairman Technical Section—Z. E. Merrill, assistant general manager, Mountain States Power Company, Albany, Ore.; chairman Accounting Section—A. J. Johnstone, auditor, Portland Electric Power Company, Portland; secretary-treasurer—W. F. Miller, auditor, The Washington Water Power Company, Spokane.

Utility Man Discusses Rates at Municipal League Meeting

P. M. Parry, commercial manager of the Utah Power & Light Company, Salt Lake City, was one of the principal speakers at the annual convention of the Utah State Municipal League, held at Mount Pleasant, Utah, July 29-30. The membership of this league comprises city officials of the various cities in the state, and its object is to develop the utmost efficiency in the handling of municipal affairs.

"Rate-Making for Electric Service" was the subject of Mr. Parry's talk. He explained some of the factors that enter into the making of rates, discussing also some of the outstanding facts of interest in connection with his company's operations during the past twelve years. Mr. Parry also introduced a number of points in support of private ownership of public utilities.

Utah Engineers Hold Annual Outing.

The Utah chapter of the American Institute of Electrical Engineers held its annual outing at the Olmsted plant of the Utah Power & Light Company on the Provo River, about forty miles south of Salt Lake City, on July 18. The commodious and beautiful grounds surrounding this plant provided an ideal location for such an event. About one hundred members were in attendance.

Personals

L. T. Stone, for the past nineteen years in the service of the Southern California Edison Company, Los An-



L. T. STONE

geles, has been made district manager for the company in Tulare. He succeeds J. R. Haskin who has been transferred to the general offices in Los Angeles. Mr. Stone started his career as office boy and messenger in the Los Angeles district and served successively as bookkeeper, statistician, chief clerk, traveling auditor and credit agent. He is well known in the San Joaquin Valley, particularly in the Porterville district, where he was chief clerk from December, 1919, to May, 1923.

H. H. Allison, formerly with the Electric Appliance Company of San Francisco, recently became affiliated with the general offices of the Great Western Power Company of California. The kitchen lighting campaign of the company, plans for which were announced recently, will be carried out under Mr. Allison's supervision.

W. D. Hamerstadt, general manager of the Rockwood Manufacturing Company of Indianapolis, was a recent visitor in San Francisco.

L. W. Clifford of the Industrial Heat Division of the Westinghouse Electric & Manufacturing Company sailed from San Francisco recently for Yangchow, Kiansing, China, where he will teach mathematics and science in the Mahan School under the auspices of the Board of Foreign Missions of the Episcopal Church.

L. F. Watson has been appointed recently by the Westinghouse Electric & Manufacturing Company as street lighting engineer for Los Angeles.

James P. Britt of the Los Angeles office of the state railroad commission has been appointed assistant secretary to the commission. This appointment is made possible by an amendment to the Public Utilities Act passed by the last legislature, and will enable the Los Angeles office to attend to all matters of process and certification which heretofore have been done under seal in the San Francisco office.

W. A. Thompson, Federal Electric Company, Chicago, was a recent visitor in San Francisco.

Frank D. Fagan, special representative of the International General Electric Company in Japan, and a former resident of San Francisco, recently passed through that city en route to New York.

W. K. Turner, J. L. Marsh and L. B. Pierson have been added to the staff of the Curtis Lighting, Inc., Chicago, in various capacities. Mr. Turner will be associated with I. M. Kirlin, resident engineer, Detroit. Mr. Marsh will be associated with J. R. Henry, resident engineer at the Philadelphia office and Mr. Pierson will be connected with the Rochester, N. Y., office, working with C. B. Pate, resident engineer.

W. L. Henderson, associated with the San Joaquin Light & Power Corporation at Selma, Calif., was a recent visitor in San Francisco.

R. H. Ballard, vice-president and general manager, Southern California Edison Company, Los Angeles, shortly returned from an extended European tour.

S. E. ("Steve") Gamble, for the past eight years connected with the industrial division of the Westinghouse Electric & Manufacturing Company, San Francisco, has resigned to become manager of the Oakland office of Latourrette-Fical Company.

F. E. Hastings of the Curtis Lighting of California, Inc., Los Angeles, recently visited Salt Lake City, Utah.

P. H. Booth, district sales manager, Edison Electric Appliance Company, Inc., Los Angeles, and R. W. Turnbull, district sales manager for the same company in Portland, recently spent some time in San Francisco and the Bay region.

G. H. P. Dellmann, lighting sales engineer of the San Diego Consolidated Gas & Electric Company, together with H. W. Jorgensen, city engineer of San Diego, made a recent visit to a number of southern California cities to observe methods of street lighting.

A. Emory Wishon, vice-president and general manager, San Joaquin Light & Power Corporation, Fresno, Calif., paid a visit to San Francisco a short while ago.

Tracy Simpson, formerly district manager, Federal Sign Company, San Francisco, and now affiliated with the Household Utilities Finance Corporation, San Francisco, recently returned to that city after an extended Eastern trip.

K. E. Van Kuran, manager of the Los Angeles division office of Westinghouse Electric & Manufacturing Company, was a recent visitor to San Diego. He brought with him as his guests to the Electric Club luncheon F. C. Ohmstead, chief engineer of the stoker department of the Westinghouse company, and D. E. ("Daddy") Drake, retired, Westinghouse man of much fame and experience.

H. R. Olsen, assistant treasurer of the Portland office of the Pacific States Electric Company, has been transferred to the Los Angeles office to fill the position recently vacated by H. C. Chapman.

W. G. ("Mac") Boyce, of the Fairbanks-Morse agency in San Diego, Calif., has been a frequent visitor recently to Nevada mining districts in the interests of mining property he owns in the region.

Z. E. Merrill, assistant general manager, Mountain States Power Company, Albany, Ore., lately visited Spokane, to attend the meeting of the newly appointed executive committee of the Northwest Light and Power Association at which Mr. Merrill was named chairman of the Technical Section for the coming year.

R. G. Chamberlain, district manager, The Hurley Machine Company, Seattle, visited Spokane recently enroute to Boise.

Millard Sebern, Washington Electric Supply Company, Spokane, Wash., spent a few days in San Francisco recently.

E. T. Milham, first executive secretary of the Rocky Mountain Electrical Cooperative League, Salt Lake City, joined the staff of the Stevens Sales Company of that city.

W. H. Lines, since 1923 construction engineer for the Portland Electric Power Company, Portland, has been appointed assistant to the president, a newly created position in that company. Mr. Lines was born in Rochester, N. Y., in 1887, and after attending public school there he entered Cornell University, Ithaca, N. Y., and graduated in 1909 with the degree of M.E. After graduation he entered the engineering department of the Rochester Railway & Light Company, Rochester, remaining until 1912, when he went to Portland to join the organization then known as the Portland Railway, Light & Power Company. Here he spent four years as industrial engineer, specializing in power sales and power promotion, and one year as secretary to the president. In 1917 he resigned to accept a position as plant superintendent of the Northwest Steel Company, Portland, which then was commencing an extensive boat-building program for the government. After this activity of the steel company was finally wound up in 1921, he started his own business of manu-



W. H. LINES

facturing wooden ware as the Champion Manufacturing Company, Portland. In 1923 he retired from active participation in this business to permit of its reorganization for the manufacture of walnut and mahogany furniture, and returned to the Portland Electric Power Company as construction engineer. In this capacity he has been engaged principally in a study of the needs of the entire system from the generating plants to the customers' meters, until his recent appointment.

W. A. Knost, for the past four years secretary of the Los Angeles Electric Club, has resigned that position in order to devote his entire time to his new work on the sales staff of the Illinois Electric Company. Mr. Knost is to handle appliance sales and general merchandise, exclusive of radio equipment, and will have his headquarters at 315 South San Pedro Street, Los Angeles.

Wm. F. Raber, general manager of the San Diego Consolidated Gas & Electric Company, recently returned from a trip to Chicago, coming back by way of Pueblo, Colo., where he was formerly manager of the Southern Colorado Power Company.

Lafayette Hanchett, president of the Utah Power & Light Company, Salt Lake City, left during the latter part of July, with Mrs. Hanchett, for an extended trip to Europe. The trip will cover a period of about three months.

H. D. Schute, vice-president, Westinghouse Electric & Manufacturing Company, East Pittsburgh, recently spent some time in Seattle in the inspection of the Westinghouse local plant.

V. S. Beam, representing the Westinghouse Electric & Manufacturing Company with offices in New York City, was a recent visitor in San Francisco.

W. A. Thompson, representing the Federal Electric Company of Chicago, was a recent visitor in San Francisco.

W. W. Briggs, for the past few years connected with the Federal Light & Traction Company, New York City, has been appointed vice-president and general manager of the Grays Harbor Railway & Light Company, Aberdeen, Wash., which is controlled by the Federal company. He succeeds P. A. Bertrand, who has resigned to enter the New York office of the latter. Mr. Briggs is particularly well known in San Francisco, where he was district



W. W. BRIGGS

manager for the Westinghouse Electric & Manufacturing Company for a number of years and later became general manager of the Great Western Power Company of California. In 1918 he went East to join the Westinghouse forces in New York City, and subsequently entered the Federal Light & Traction organization. In addition to his duties as manager of the Grays Harbor company, Mr. Briggs also will be the directing head of several affiliated companies.

L. B. Osborn, formerly manager of the San Francisco and Oakland Thor Shops for the Hurley Machine Company, Chicago, has been appointed manager of all the Thor Shops on the Pacific Coast, with headquarters in San Francisco.

Edward Poirier, chief clerk at Hood River, Ore., for the Pacific Power & Light Company, Portland, has resigned to become associated with a hardware store in that city. His resignation has been made the occasion for the promotion of the following clerks: L. C. Davis, from Sunnyside, Wash., to Hood River; E. G. Richards, from Goldendale, Wash., to Sunnyside; and R. G. Dalglish, from the stores department at Yakima, Wash., to Goldendale.

Stephen ("Steve") Babcock, formerly with the San Francisco office of the Westinghouse Electric & Manufacturing Company, has been transferred to the company's Salt Lake City office.

W. W. Wheat, manager, North Coast Electric Company, Portland, Ore., was a Seattle visitor a short while ago.

H. C. Chapman, district treasurer, Pacific States Electric Company, Los Angeles, has resigned his position to become president of the California Wholesale Electric Company of that city.

J. T. Gleason, manager, North Coast Electric Company, Seattle, Wash., recently visited Salt Lake City, Utah.

H. E. Sandoval, president Sandoval Sales Company, San Francisco, visited Los Angeles recently.

Joseph S. Thompson, president, Pacific Electric Manufacturing Company, San Francisco, was the author of the play produced this year at the annual jinks of the Bohemian Club.

S. E. Hodge, for many years associated with the Westinghouse Electric & Manufacturing Company, has opened a new branch office of that company at Medford, Ore. Mr. Hodge has represented the Westinghouse company in Butte, Mont., Alaska, Seattle, and Johannesburg, South Africa.

D. M. Roderick, Seattle district manager of The Hoover Company, recently made a trip to the Hoover general offices and main factory at Canton, Ohio.

Warren Bruce, treasury department, Pacific States Electric Company, San Francisco, has been appointed assistant treasurer of the Portland office of that company. Mr. Bruce will fill the position vacated by H. R. Olsen who has been transferred to the Los Angeles office.

H. H. Courtright, manager, Valley Electrical Supply Company, was a recent visitor in San Francisco.

D. L. Scott, advertising manager, Los Angeles Gas & Electric Corporation, recently returned from Seattle, where he attended the Pacific Coast Advertising Clubs Association convention in that city.

E. J. Kingsbury and E. E. King, formerly with Dwight P. Robinson & Company, Inc., have opened an office in the Grant Building in Los Angeles as consulting engineers under the name of Kingsbury & King. Mr. Kingsbury is also president of The Engineering Corporation of Long Beach, Calif., and is the inventor of several patented devices which bear his name and will be manufactured by this corporation.

H. H. Daley, associated with the Magnavox Company, Oakland, returned from Los Angeles recently.

E. A. West, formerly superintendent and chief engineer of the Denver Tramway Company, Denver, has been appointed general manager of the Utah Light & Traction Company, Salt Lake City, succeeding H. F. Dicke, who has been made assistant to the president of the Lehigh Valley Transit Company, with headquarters at Allentown, Pa. Mr. West had held his position with the Denver company since 1916, with the exception of a period of a little more



E. A. WEST

than two years during the World War when he was Pacific Coast representative of the Emergency Fleet Corporation of the United States Shipping Board in charge of all matters pertaining to housing and transportation facilities for the various ports up and down the Coast. After leaving college Mr. West served in the United States Navy for several years. Prior to his association with the Denver Tramway Company he was assistant engineer of the traction system in Portland, Ore., for eight years. He began his career with the Boston elevated system in 1905, starting as a clerk.

Raymond Wilcox, formerly with Dwight P. Robinson & Company, Inc., has become treasurer and general manager of The Engineering Corporation recently incorporated to conduct a manufacturing business in Long Beach, Calif.

G. E. Honn, manager tower department, Pacific Coast Steel Company, San Francisco, recently visited Los Angeles in the interest of his firm.

Obituary

Joseph Mayo, pioneer in electrical power development in California, died suddenly in Berkeley, Calif., Aug. 4. He came to California forty years ago, settling in Healdsburg, where he operated one of the first electric plants and also did much to promote such projects in Crockett and Martinez.

Thomas Victory of the Victory Electric Company, Los Angeles, died in that city July 27.

Philip Benjamin, salesman for the Fobes Electric Supply Company in San Francisco, passed away on July 29.

TRADE NOTES

The Robbins & Myers Company, Springfield, Ohio, has issued recently bulletin No. 141, which covers its types "S," "C" and "T" direct-current motors.

General Electric Company, Schenectady, N. Y., has published recently a new switchboard instruction book containing descriptions and prices of its trated with photographs, diagrams, tables and formulas. The book is designed for those engaged in the construction, installation, maintenance and operation of switchboards.

Edison Electric Appliance Company, Inc., Chicago, has issued recently a profusely illustrated dealer's catalog containing descriptions and prices of its latest Hotpoint appliances.

Altorfer Brothers Company, Peoria, Ill., has announced the development of ABC Double A electric washer, which was exhibited at the jobbers and distributors' convention held at Peoria in June.

The Louis Allis Company, Milwaukee, Wis., has issued a new bulletin describing and illustrating its Allis adjustable delivery motor drive, an alternating-current drive with an infinite number of speeds, which it is claimed is adapted particularly for use with stokers, conveyors, traveling ovens and similar equipment.

The Robbins & Myers Company, Springfield, Ohio, has issued recently bulletin No. 143 describing and illustrating its Type "L" constant speed polyphase induction motors.

Baker Electric Company, Los Angeles, has moved from 449 South Los Angeles Street to 1159 South Los Angeles Street, which gives the firm additional space to care for its increased business.

The Ward Leonard Electric Company, Mt. Vernon, N. Y., has announced the appointment of Warburton, Franki, Ltd., Sydney and Melbourne, Australia, as its selling agents in that territory.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued recently two interesting papers by Wirt S. Scott, entitled "Power Rates to Encourage Industrial Heating" and "Practical Applications of Electric Heat." Another interesting booklet has just been produced covering the "Installation of Westinghouse Electric Industrial Heating Apparatus," which contains a list of some of the more important electric industrial heating applications which the Westinghouse company has installed.

Haag Brothers Company, Peoria, Ill., claims it has produced a new model in electric washing machines called the "Haag Vortex" because of the whirlpool action of the agitator. The large increase in manufacture has necessitated the building of a new plant addition which is now in course of construction. They also have formed several large new jobber connections, among them being the Hydro Motor & Manufacturing Company at Detroit, Richter Sales Company at Seattle, and Electric Jobbers' Syndicate at Boston.

Pass & Seymour, Inc., Syracuse, N. Y., has placed on the market a new and complete line of all-porcelain receptacles, which have many new features, the porcelain shade-holders and the porcelain rings being threaded to turn on the heavy metal lamp shell which extends through the porcelain cover, making a compact unit. The shade-holder feature eliminates the usual cover screws and makes the cover surface perfectly smooth. Complete selling literature is available on the new line.



K. E. Van Kuran, on Friday mornings before he dashes down to his office, where the door states that he is district manager of the Los Angeles establishment of the Westinghouse Electric & Manufacturing Company, meets the rest of the Breakfast Club and rides from 7 to 8:30. We've looked over the breakfast menu and would be willing to wager our last week's winnings in a crooked dice game that on the return to the outdoor "chow house" even Spark Plug would be bested.

Johnston-Ayres Company and Evans Barnhill, Inc., San Francisco advertising agencies, recently have consolidated their business as announced by K. L. Hamman, president of the Johnston-Ayres Company. The combined business will be administered under the name of the Johnston-Ayres Company with offices in the First National Bank Building, San Francisco. The Johnston-Ayres Company was established in 1904 and is affiliated with the L. S. Gillham Company of Los Angeles and Salt Lake City and the K. L. Hamman-Advertising in Oakland.

Perkins Corporation, South Bend, Ind., has issued a pamphlet descriptive of its new Perkins Aeroelectric, which it claims has many advantages for the farmer, bringing a windmill-driven electric plant to his door with an inexhaustible supply of electricity. It is simple in construction, having only four moving parts all running in oil. The mechanism of the machine is described fully in the pamphlet.

Curtis Lighting of California, Inc., Los Angeles, recently has developed two new X-ray silvered mirrored glass reflectors known as Jove No. 600 and Jupiter No. 610. It also has produced two new holders, Nos. 10,600 and 10,700. The former is made to fit X-ray receptacle and box cover combination, while the 10,700 holder will fit any standard brass shell, porcelain, conduit or weatherproof socket.

New England Electric Company, 1951 Lawrence Street, Denver, has designed recently an externally operated flush type distribution cabinet with enclosed main line switch. The Commercial Manufacturing & Supply Company, also of Denver, has perfected a similar device.

Jackson-Brannan Telephone Service Company recently has been organized by R. E. Jackson and H. M. Brannan, both of whom formerly were associated with the Los Angeles Telephone & Signal Company. They are located at 1118 West 8th Street, Los Angeles.

The Balboa Electric Company has moved recently into its new quarters at 2946 Adams Avenue, San Diego. The concern formerly was located at 438 University Avenue.

The Pelton Water Wheel Company, San Francisco, has issued bulletins 21 and 22, which are fully descriptive of its new Type FD and Type T pumps.

The California Electric Works, Inc., now is occupying its new quarters at 420 Eighth Street, San Diego. The firm recently has taken over the Westinghouse motors.

Ernest Ingold, Inc., wholesale radio, opened on July 24 and 25 its new 3-story, steel and concrete building at 930 Van Ness Avenue, San Francisco, which it is announced will be "devoted exclusively to the finer things of radio and dedicated to the service and profit of the dealers of northern California."

Laundryette Manufacturing Company, Cleveland, Ohio, has opened recently a Pacific Coast district office at 115 Townsend Street, San Francisco. E. B. Anderson has been placed in charge of this territory, while H. D. Mills has been appointed Western sales manager covering Denver, Salt Lake City, Vancouver, B. C., Seattle, Portland, San Francisco and Los Angeles.

The Electro-Kold Corporation, Spokane, makers of the Electro-Kold home refrigerator, has established two new agencies recently for the distribution of its product. These include the Mountain States Power Company, Albany, Ore., for the territory served by this company in and around Albany, and R. W. Wilson, 137 East White Oak Street, Monrovia, Calif.

The Pacific Electric Manufacturing Company, San Francisco, recently has opened a district office in Los Angeles at 804 I. W. Hellman Building for the purpose of giving better service to its customers in the Southwest territory. L. C. Williams, formerly of the Los Angeles Bureau of Power and Light, has been made manager.

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

Load Builders for Utilities

Careful surveys of consumers accounts for similar periods before and after the purchase of washing machines have demonstrated conclusively to scores of Public Utilities that the advent of a washer in a home means a material increase in the use of current. In some surveys this increase has amounted to over 10%.

Of equal importance is the proven fact that Meadows Washers give such universal satisfaction and require so little attention that they build friendship and confidence between the utility and consumer and thereby encourage the use of other appliances.



Utilities Campaign Dealers Opportunity

Never before has the Western dealer had such an opportunity to capitalize the splendid advertising of Public Utilities on domestic electric appliances.

The alert dealer will parallel these big campaigns in his own community, thereby gaining for himself and his store the advantage of thousands of dollars in appliance advertising by the utilities and thousands of personal calls by their representatives.

Such a dealer will select such a washer as The Meadows because of its absolute dependability, absence of service needs and its habit of making friends.

THE MEADOWS MANUFACTURING COMPANY

General Offices and Plant, Bloomington, Illinois

WESTERN DISTRIBUTORS:

Walcherson Electric Sales Company
373 Brannan St., San Francisco, Calif.
Butte Electric Company, Butte, Montana

CLIFFORD A. WILLIAMS

Western Sales Manager
373 Brannan Street, San Francisco, California

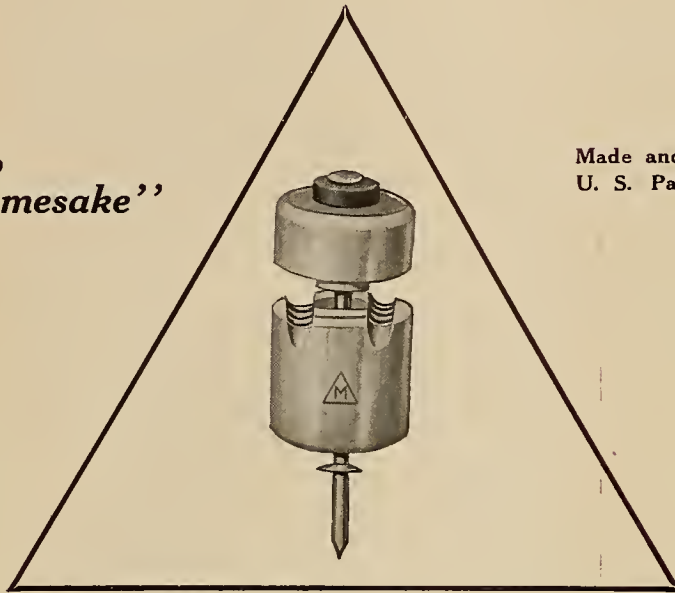
WESTERN DISTRIBUTORS:

Capitol Electric Co., Salt Lake City, Utah
Fobes Supply Company, Seattle, Wash.
Fobes Supply Company, Portland, Ore.

THE "BULL DOG" ASSEMBLED SPLIT KNOB

*"Has a Grip
Like Its Namesake"*

Made and sold under license,
U. S. Patent, Feb. 3, 1920.



The projection on the top piece, the recess in the bottom, the long cement coated nail, the top leather washer, the metal washer on the nail, are a few of the superior features of the Bull Dog Assembled Split Knob. Its the knob for the job.

MANUFACTURED BY

ILLINOIS ELECTRIC PORCELAIN Co.

MACOMB, ILLINOIS

Complete Stocks Carried by

BAKER-JOSLYN COMPANY

DISTRIBUTERS

ELECTRICAL EQUIPMENT AND CONSTRUCTION MATERIALS

SAN FRANCISCO

LOS ANGELES



Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."

Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

J. W. OTTERSON, Associate Editor
G. R. HENNINGER, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

R. N. PHELAN, Associate Editor
B. H. SNOW, Northwest Editor

VOLUME 55

SAN FRANCISCO, SEPTEMBER 1, 1925

NUMBER 5

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McGraw-Hill Company of California — 883 Mission St. — SAN FRANCISCO

Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

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CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Teath Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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By McGraw-Hill Company of California

Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

Export Publishers Unite

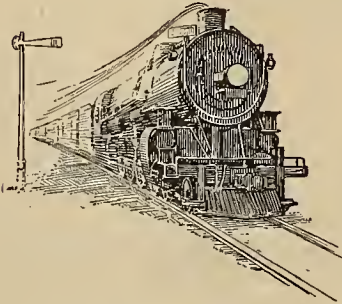
ESTABLISHMENT of the Business Publishers International Corporation to meet more adequately the demand for specialized business publications in the fields of overseas trade and industry has been announced by the McGraw-Hill Company and the United Publishers Corporation. They jointly will control the new organization.

Three publications already in existence form the nucleus of the new company, which will maintain editorial and business representatives in the important commercial centers abroad. The papers are Ingenieria Internacional (International Engineering), a McGraw-Hill industrial and engineering monthly circulating in Spain and Latin America; El Automovil Americano and The American Automobile (Overseas Edition) in Australia, New Zealand, South Africa, India, Great Britain, Norway, Denmark, Holland, Belgium; in the Orient and other territories.

The new corporation is headed by Mason Britton, president. He is vice-president of the McGraw-Hill Company. John Abbink, until formation of the new publishing firm business manager of Ingenieria Internacional, is vice-president and general manager. J. L. Gilbert, who was business manager of the two automotive publications, is vice-president and secretary. C. A. Musselman, president of the Chilton Class Journal Company, the automotive publications division of the United Publishers Corporation, is treasurer.

The board of directors includes, in addition to the officers, Charles G. Phillips, president of the United Publishers Corporation; Malcolm Muir, a vice-president of the McGraw-Hill Company; Philip S. Smith, editor of Ingenieria Internacional, and George E. Quisenberry, editor of El Automovil Americano and The American Automobile (Overseas Edition).

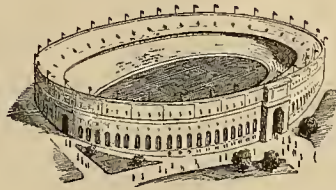
Stop



RAILROAD operation depends heavily on air brakes and block signals. These two essentials of safe operation for high speeds and heavy trains are provided by the Westinghouse Air Brake Co. and the Union Switch & Signal Company, both of which have made extensive use of Stone & Webster construction service for important additions to their plants.

Look

NEXT Fall will see the UNIVERSITY OF PITTSBURGH in possession of a splendid new STADIUM being built under the supervision of STONE & WEBSTER.



The seats are in two tiers fully enclosing the playing field and affording a capacity of 70,000. Mr. W. S. Hindman is Chief Engineer with Miss Marion K. Hindman assistant on architectural design.

Listen

THE President of The American Sugar Refining Company wrote the Victor Talking Machine Company: "We employed Stone & Webster, Inc., for the construction of our new Baltimore Refinery . . . I recommend them to you unreservedly." Victor employed us to build a new manufacturing building, to enlarge another building, to remodel the power house, and later to put up another building.

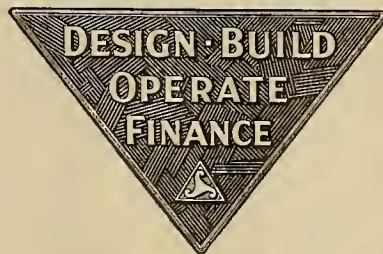


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STONE & WEBSTER-built plants and structures are found everywhere filling a multitude of power, industrial and other uses. Whatever you make or do you can profit by our varied experience for your new construction.

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EDITORIAL

Conciliating the Ice Man

HOW'D you like to be the ice man?" "Well," you reply, "in the light of the possibilities of the domestic electric refrigerator, his prospects look not too good." No doubt he, himself, is viewing the situation somewhat with alarm, and yet we doubt if he need seriously concern himself. In the gradual transition from a universal use of the ice box to a like use of the electric refrigerator, he will find other uses for his ice service, or, failing this, he will pass quietly out of the refrigeration picture and into some other. You can't keep a good man down, and most ice men are good men.

If his days are numbered, at least they are numbered high. No sweeping change will be effected over night, and the ice man will have a long time in which to gage in which direction the wind of fortune is wafting him. Even after the most intensive application of brain and science to the production and distribution of automobiles for domestic and industrial use, we still find the horse has his place in the sun, while the electric and steam railroads already are beginning to recover from the first jolt administered by the jitney, the auto bus and the freight truck. Innumerable other examples could be cited from industrial history of the failure of a new device or process completely to supplant the old, or of instances where transition from old to new has been so slow as to be practically painless.

Nevertheless the ice man probably will have to be conciliated. In some instances he will be one of the largest power users of the utility company that is selling electric refrigerators to his ice customers. He will mention this to the general manager, and the sense of injury in his tone will be unmistakable. He will be told that a similar complaint came from the laundry man a few years ago when the utility company first initiated an intensive campaign on washing machines, and he will be shown that the laundries still are running. If ordinary arguments fail, the general manager can throw up his hands and say that he is powerless to stem an economic tide.

Industrial changes follow economic laws. If a thing is right it endures; if wrong, it soon reaches the limbo of forgotten things. Domestic refrigeration, it appears, is right and has come to stay, and the movement will grow in spite of the protests of the ice man, and whether or not the power company actually fosters the movement in its territory. Such influences may affect to some extent the speed with

which the movement gains headway in some localities, and though they may to a degree retard it, they cannot stop it. So, be prepared to conciliate the ice man.

Dr. Harris J. Ryan's New High-Voltage Laboratory

IN the development of high-voltage transmission to 220,000 volts on the Pacific Coast, the laboratory of Dr. Harris J. Ryan at Stanford University has played an important part. Under his direction experiments were performed which resulted in the development of 220-kv. insulators. Five years were required for that work. In the meantime efforts of that eminent electrical scientist have been devoted to problems dealing with the study of corona and the measurement of energy at high voltages.

On another page of this issue Dr. Ryan discusses the new high-voltage laboratory which is being erected at Stanford and some of the problems which he expects to attack when it is completed. His advice to the industry is that the problems that must be met fifteen or twenty years hence should be attacked today. His impressions regarding the future of the power industry of the West are enlightening. The picture he paints of the future Pacific Coast transmission system is not an idle dream. Study of the economic development of this section of the country during the past decade indicates that his predictions must be realized if adequate electric service is to be supplied to the great metropolitan areas.

The industry will watch with keen interest the experiments which Dr. Ryan will conduct in his new laboratory, knowing that the future of high-voltage transmission will depend to a great measure upon the success of these studies.

Baker River Plant Is Monument to Engineers

BAKER River, the new 40,000-hp. hydroelectric plant of the Puget Sound Power & Light Company, will be completed early in October. To those unfamiliar with the details of construction of this station this announcement means little. As a matter of fact, the completion of the plant according to schedule is a high tribute to the engineers in charge of the development.

Late last summer labor trouble developed, resulting in a complete shutdown on the dam due to the activities of agitators. A few more days work at that time and sufficient concrete would have been

poured to insure the project against trouble from high water. When work was resumed, the period of high water had set in and many difficulties were encountered. Work in a narrow canyon with flood water at the maximum offered almost insurmountable obstacles. These obstacles were met and overcome and the balance of the work speeded up to the point where the plant could be completed as originally scheduled.

Labor troubles and the adverse forces of Nature are only a few of the difficulties which engineers charged with the construction of works of this character must overcome. If the public at large were to be informed of the romance of overcoming these obstacles it would have a higher regard and a greater respect for the men and companies which are furnishing it with electric service.

Hetch Hetchy Contract Saves Money for San Francisco

NOW that the Secretary of the Interior has declined to decide one way or the other as to the validity of the contract for the sale of Hetch Hetchy power, both parties to the controversy seem to be left high and dry as far as the legal status of the existing arrangement is concerned.

From a practical standpoint, however, the fact remains that a contract is in force between the City and County of San Francisco and the Pacific Gas and Electric Company by which the city is assured of an income of \$2,000,000 per year from what otherwise would have been a non-productive asset for some time to come.

Why there should have been any division of opinion as to whether the interests of the taxpayers would best be conserved by obtaining an immediate income of \$2,000,000 per year or nothing at all is beyond the ken of mortal man, especially in view of the fact that the contract was subject to cancellation by the city practically without notice at any time.

The Secretary of the Interior is quoted as having said, "I believe that the city should now be well satisfied that it has gone ahead with power delivery under the contract, and is reaping the profits from its great Hetch Hetchy venture." This utterance seems safe, sane, and the very essence of sound common sense, and, we venture to add, a matter of more than passing interest to the taxpayers of San Francisco, who may contemplate with undoubted satisfaction the possible reduction of the tax rate, a new idea in the annals of American municipalities.

Is the Power Company Interested in Radio Sales?

THOSE power company men whose duty it is to answer trouble calls on radio interference are perhaps of the opinion that the power company is interested in radio in the same sense that a summer boarder is interested in the mosquito crop. That the subject of radio from a central station standpoint has another aspect to it was forcibly brought home to the commercial manager of one western company recently who was checking up the results of a complete kitchen lighting campaign. He found one dis-

satisfied purchaser who admitted the worth of the illumination, but who complained of the size of the bill. The commercial manager did not believe the increased consumption of electricity was due to the kitchen light and made a few investigations for himself. He found that the customer had purchased a new radio set simultaneously with the revised lighting of his kitchen and was sitting up until two and three o'clock nightly to get the programs from favorite stations. He pointed out the effect of this practice upon bills—and the customer cheerfully paid the account. A little further investigation convinced the power company man that the purchase of a radio set was almost always coincident with a greater consumption of electricity for lighting purposes and he is now seriously considering radio as a side line to be handled by his company's retail department.

Another Check on the Results of the Home Lighting Campaign

DID the study of Home Lighting Primers in the homes of thousands of school children in all parts of the country have any appreciable effect upon the later lighting of their homes? It is possible to check up in a rough way upon the increase in number of outlets in new homes under construction, but this can be no accurate index of results. The effects would be shown rather in the number of lights replaced by those of a larger capacity and by the introduction of portable lamps at strategic points to remedy faults in fixture location which are not susceptible to ready change. Where the need for revision was more drastic and the means at hand to effect the reform, the contest may even have resulted in remodelled lighting in an old home. Very few of the families could have contemplated immediate building and probably the standards in this field were but little changed by the event. Here are three records from Utah which indicate something of what is going on in the average home, however, in those important household revisions which are so difficult to check because they do not show on the surface.

In the first place, Utah contractors report an unusual number of remodelling jobs for the present building season. Secondly, the records of one important electrical concern in that district show that sales of portable lamps have been two to one this year as compared with last. And thirdly a recent lamp shade class conducted by a Salt Lake department store called out a response from 435 women, or more than three times the usual number enrolling in such work. The driftwood on the surface indicates the direction of the current and these facts are significant in view of the glimpse they offer in evidence of the widespread interest in illumination which has recently developed in the home.

Skagit Problem May Be Solved

SEATTLE'S political puzzle, sometimes known as the Skagit power project, stands in a fair way of being solved. With the appointment of a committee of three independent engineers to make a study of

the situation and recommend the next step in its development the taxpayers of that city may hope for a solution of the problem that will result in the realization of a fair return on the millions invested. It is interesting to note that the engineers are all residents of the city; they are familiar with the enormous expenditures on the project and the political squabbles which have resulted. Had such a committee been empowered to make a study of the development before the initial bonds were voted and had they reported that approximately twelve millions would be needed to construct a plant which politicians promised the taxpayers for four millions, it is doubtful if the development would have been undertaken. Fortunately the appointment of this committee cannot be likened to calling in the doctor after the patient has died. In this case it is only the quack remedies that have failed.

DISCUSSION

Reader Warns Industry Against Dogma Preached by Gifford Pinchot

To the Editor:

Sir: Congratulations to you on your splendid editorial on Gifford Pinchot and his ideas of curbing the "electrical monopoly." You find he is rather careless as to his facts and conclusions.

I had an odd experience with Gifford Pinchot some years ago that threw a new light to me on his temperament and his actions. I was then a reporter on the New York Times. As everybody now knows, a famous quartette was once composed of Theodore Roosevelt, Gifford Pinchot, George W. Perkins and Amos Pinchot.

There came a time when the Pinchots hated Perkins and disliked to see him in the Roosevelt family. Yet Colonel Roosevelt stood by Perkins on many issues, and at last Amos Pinchot broke out in a public speech against the Bull Moose party and announced his intention to leave it and seek an alliance and amalgamation between the Single Taxers, the Socialists, the Labor party and one wing of the Bull Moosers—such as he could swing with him.

It happened to be my misfortune to report this speech, and, if I have eyes to see and ears to hear with, I know I did it correctly. But Gifford Pinchot, who was not present, rushed to the office of the New York Times and there gave his word of honor that it was all a lie—that the reporter had reported things his brother had not thought of or uttered. He declared Amos was still loyal to T.R. And Amos O.K.'d Gifford's version.

When I next reached the office of the Times after this visit by Gifford Pinchot I found myself fired off the bat and out of hand on Gifford Pinchot's say-so about what I had done.

I couldn't feel bad for myself as I left the Times office. I could only think, "Poor Gifford, poor Amos,

they have got to live with themselves after making such a muss of their lives." I had been taught by David Starr Jordan at Stanford University that one had better so live that he can always remain good company to himself. And the ninth commandment rather loomed in my mind, "Thou shalt not bear false witness."

A beautiful thing happened right after that. I received a telephone call from Colonel Roosevelt's secretary, John McGrath. He said the Colonel wanted to see me, and we met at his office in connection with the Metropolitan Magazine. For two hours Colonel Roosevelt detailed to me his dealings with the Pinchots and then said, "I want to shake hands with you over my dead regard for Amos Pinchot, for he laid down on you as he laid down on me. And I can never work with him again, or with Gifford as I used to."

After that I noticed things—as to Gifford. I had been an ardent admirer of his. In the Masses magazine, professedly revolutionary, Amos Pinchot came out with an article labelling Theodore Roosevelt as "the great male beast of Oyster Bay" and practically duplicating my article about his public speech repudiating the Bull Moose party. I wondered then if Gifford would feel sorry. But he never relented nor made the amend I would have been glad to make had I wronged any human being on earth.

I noticed a little later that Gifford tried to launch himself for president on a boom as the man who settled the coal strike in Pennsylvania. Calvin Coolidge, incumbent of the presidency, had given Gifford the chance to settle this coal strike as the President's agent, yet he was using the flair of popularity the task brought him to run against President Coolidge for the nomination. It seemed typically unfaithful to me, from my viewpoint on him. Of course he got nowhere.

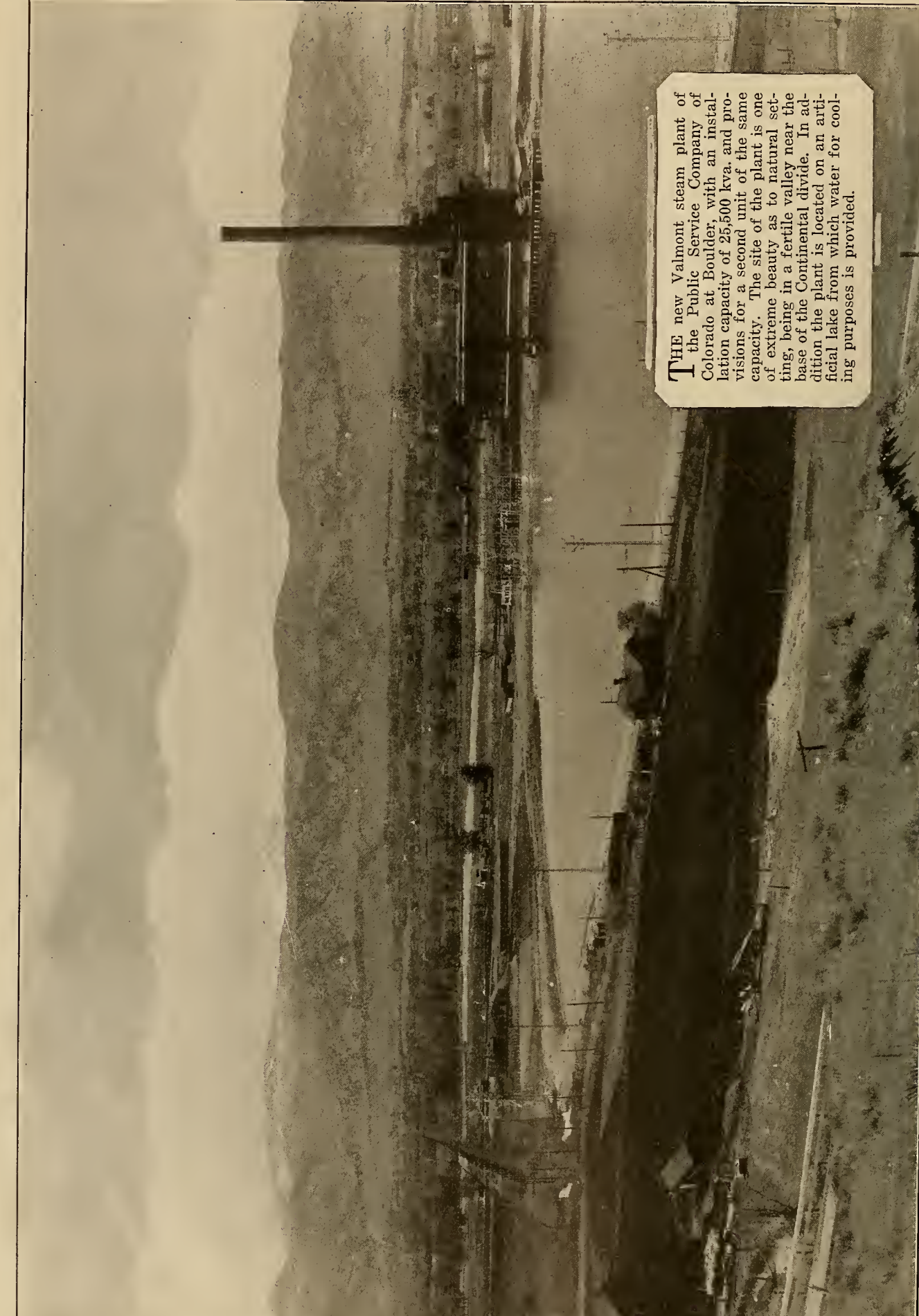
Next he ran for a presidential nomination on a prohibition issue combined with an assault on Secretary Mellon. He failed to make the Republican Convention as a delegate at large, however, and it was interesting to note that Secretary Mellon said of him, when he was shut out, that no one could tie to him very long or guess where he would be today by his utterances of yesterday.

You are up against a real political dogmatist in this giant-power and superpower issue. I am confident he will not see anything about giant-power that he does not wish to see or advocate anything but what he thinks will stir the populace.

I hope, under the circumstances, that the electrical interests develop every possible means of reaching the public and meeting Pinchot dogma with the facts of electrical development. A foe unhindered by facts or a respect for them can do damage only among the ignorant and uninformed. Public operation of railroads, telegraphs and shipping during the war wrote too sad a record of political pilfering to serve as a recommendation for a similar disposal of our electrical problems. I hope you keep your end of the story well to the fore.

I. K. RUSSELL.

Chicago, Ill., July 29, 1925.



THE new Valmont steam plant of the Public Service Company of Colorado at Boulder, with an installation capacity of 25,500 kva. and provisions for a second unit of the same capacity. The site of the plant is one of extreme beauty as to natural setting, being in a fertile valley near the base of the Continental divide. In addition the plant is located on an artificial lake from which water for cooling purposes is provided.

Valmont Steam Plant of the Public Service Company of Colorado

THREE points of general interest to power-plant engineers present themselves in the new Valmont steam plant of the Public Service Company of Colorado, a member of the H. L. Doherty group of utilities properties. 1—It is the largest plant of its kind west of Missouri Valley points utilizing pulverized coal as fuel. 2—It is the largest steam generating plant in the country situated upon an artificial body of water. 3—It utilizes a hydraulic structure near the source of the supply stream to equalize stream flow and to insure a sufficiency of water for condensation purposes.

Steam was decided upon as being the logical development after a survey of all of the possible water-power sites within 150 miles of Denver showed that there was none commercially feasible, at least at the present time. The city of Denver constitutes the greatest single load center on the company's system. However, the power demand on the remainder of the system throws the present load center of the entire system about 6 miles to the north of the city. Hence the location of the plant, about 25 miles due north of Denver, works out very well from several angles as will be seen from subsequent discussion.

There are no usable natural bodies of water in the vicinity. There are no streams of sufficient size to provide condenser cooling water for plants of more than 25,000 kw. without recirculation, and only one of even that size, the Platte River. To plan a plant to operate with a spray pond or a cooling tower also would involve the problem of supplying the necessary make-up water. Where water already is at a premium for domestic and irrigation purposes, it was considered to be poor practice to involve this heavy annual loss when other plans for power development not only would avoid most of this loss but provide additional usable storage. Consequently cooling water is provided from an artificial lake.

The plant location selected is near the confluence of the Middle Boulder and the South Boulder Creeks so that water for the lake is obtainable through a series of short canals. The present lake area of 120 acres later will be increased to an area of 540 acres and will have a capacity of 11,162 acre-ft. This will provide for an ultimate plant development of 200,000 kw. Both the Union Pacific and the Colorado &

AMONG the interesting features of this new steam station is the fact that it burns pulverized coal for fuel, it is located upon an artificial body of water which it utilizes for condensate, and it has many unique features to preserve continuity of service. It has a capacity of 25,500 kva. and was constructed at a cost of \$4,500,000. The editors are indebted to W. D. Hardaway and R. R. Throne of the Public Service Company of Colorado and to C. H. Vivian of Boulder for the material from which this article is prepared.

Southern Railroads touch the plant property, which is 940 acres in extent, and thus provide excellent transportation facilities for fuel as both lines have broad contact with the northern Colorado coal fields.

Buildings

Facing south, the plant fronts on the artificial lake. The turbine room, heat-balance section and boiler room range in the order named from south to north. The circuit breaker bay adjoins the turbine room on the west while the coal preparation building is a separate unit located at the end of

the boiler room with the stack between the two. An enclosed conveyor bridge over which the coal is transported from the pulverizers to the bunkers above the boilers is the only connection between the two buildings. A cross-section and plan of the power house is shown in Fig. 1.

The stack is 24 ft. in diameter at the bottom (inside), 16 ft. at the top and 375 ft. in height. This provides a draft of 331 ft. above the burners. To insure a working draft when the natural draft is insufficient an inner stack 5 ft. in diameter and 60 ft. high was installed. The top of this inner stack extends 12 ft. above the point at which the breeching enters, and a fan at the bottom will force air up through to create a draft to care for unusual conditions. Both stacks are of brick construction above a concrete foundation which is carried 12 ft. below grade to shale rock and extends 25 ft. above grade. The stack was erected by the Custodious Chimney Construction Company.

Cooling Water Development

One of the prime considerations affecting the selection of a site for the power house was that of adequate cooling water to provide for the present as well as for future development. This feature of the project will be watched with close interest by many power-plant engineers and executives. The degree of success attained and the obstacles which arise will determine in a large measure whether or not the future generating plants in the dry-climate areas of the West will follow this same general type. In an arid region such as Colorado where the mean annual rainfall is but 15 in. it is a genuine problem to secure an adequate water supply for a plant such as the one described in this article.

Direct use of stream flow is out of the question because of prior rights and because of the peak run-off characteristics. This stream flow is due to the fact that the snows are comparatively light on the eastern slope of the Rocky Mountains, and consequently are all brought down in about two months. Such being the case, the plant site had to be one where the topography would permit the construction of an artificial lake of the size necessary and where there would be water available to fill this reservoir.

Underlying clay and hard shale at the point selected were almost ideal for the purpose. Further, the present 2,000 acre-ft. reservoir already was constructed and can be enlarged to the ultimate capacity by the erection of one large and several small dams. A hydroelectric plant belonging to the same company is located on Middle Boulder Creek and is provided with an 11,000-acre-ft. reservoir. Between the two a very efficient distribution and use of stored water will be possible that will result in benefit not only to the power company but also to the farmers who will benefit by the additional storage capacity at this point. Minimum stream flow can be maintained from the lower (steam plant) reservoir during the summer months when water is not needed for hydroelectric purposes, and this will permit the storage of water in the upper (hydro) reservoir until winter when it is needed for power purposes.

Drainage of the reservoir made possible the construction of all of the foundations and water-handling structures of the power plant on dry land. As this is quite an advantage over having to build these works under water conditions and as it would not be possible to drain the lake with the plant operating, intake structures for five units were completed along with the power house. At the present time the discharge water is allowed to flow back into the lake at the power house and near the intake. As the capacity of the plant grows it is planned to carry this discharge across a short space and dump it into the lake at a point where the return flow distance will be about three miles around a peninsula before it can again enter the intake.

The main dam will be 3,500 ft. long, 90 ft. high above the footings, 370 ft. wide at the base and 15 ft. wide at the crest. Preliminary investigations involved the drilling of 6,000 ft. of test holes and the making of 14,000 analyses. These were carried on with the idea of using the gravel-core type of construction which is extensively used in English engineering practice but which has not been used before in this country on a dam of this size.

Fuel

Lignite coal abounds in the districts adjacent to the plant and is mined in large quantities. This fuel is being used under the boilers with good results. In fact, the design of the fuel-handling and burning equipment is such that slack may be burned with no loss in efficiency. This fact, together with the fact that about half of the coal brought to the surface from the mines is otherwise unmarketable slack, assures the plant an ample and economical fuel supply, regardless of plant capacity. The average haul from mine to plant is about ten miles, and, as before

mentioned, there are two railroads available for this service.

Due to the fact that this coal disintegrates so rapidly that it will support vegetation after three years exposure to the elements, no storage is provided at the plant at the present time. However, plans contemplate under-water storage facilities of moderate size to care for serious emergencies. At the present time coal is delivered to the plant at the rate of about ten cars daily for the one unit in operation. Bottom-dump cars are used normally, and the coal is dropped into a pit from which it is raised to a receiving hopper above the pulverizing equipment. The clam-shell hoist which serves this purpose also will serve to unload cars of other than the dump-bottom type. This hoist has a capacity of 150 tons per hour and provides weighing service while the coal is being hoisted.

From the hopper coal is fed by a short conveyor over a magnetic pulley to remove any tramp iron and on to the crushing machinery. Crushed to a one-inch size the coal is lowered to the raw coal bunkers. From this point the raw coal is fed through Woods driers, which utilize hot gases from the stack, and on to Raymond 6-ton pulverizing mills where it is ground to about the fineness of cement. The pulverized fuel then is carried to the top of the pulverizing building by means of air and dumped into 14-in. enclosed screw-conveyors which carry it to bins in the boiler room.

Storage of pulverized fuel to the extent of 40 tons is provided above each of the boilers. Four duplex feeders mounted on the bottom of each of the four bins deliver coal to the eight fantail burners where primary air at a pressure of from 16 to 20 in. is admitted. The rate of feed is controlled by variable-speed d.c. motors. Controls are so arranged that all feeds may be varied either in unison or individually. This feeder control is located on the boiler control panel together with instruments recording and indicating boiler performance.

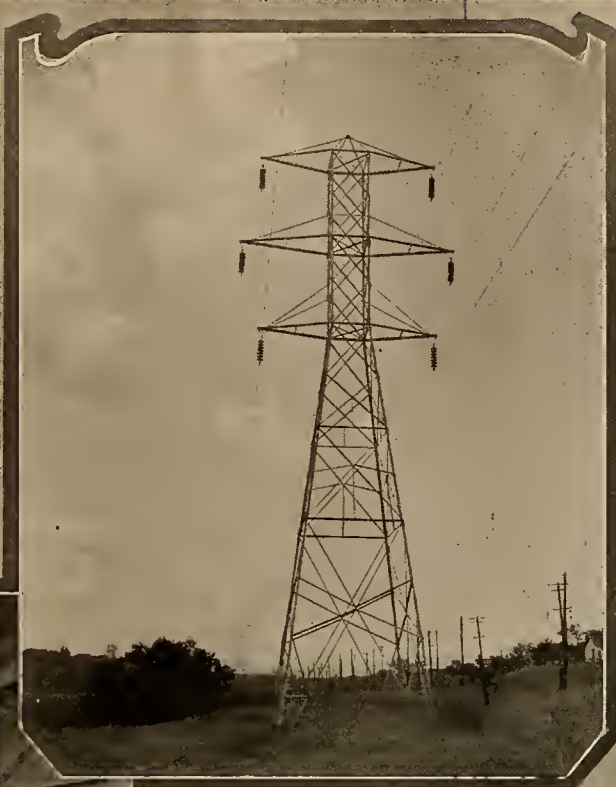
Boilers and Equipment

Coal is fired through the roof of the furnace through fantail burners set vertically at right angles to the front wall. Secondary air is admitted into the furnace through 96 openings each 7 x 9 in. in size. These openings are arranged in six zones. Each zone receives air through spring-controlled dampers set in the side walls and in the rear of the bridge wall.

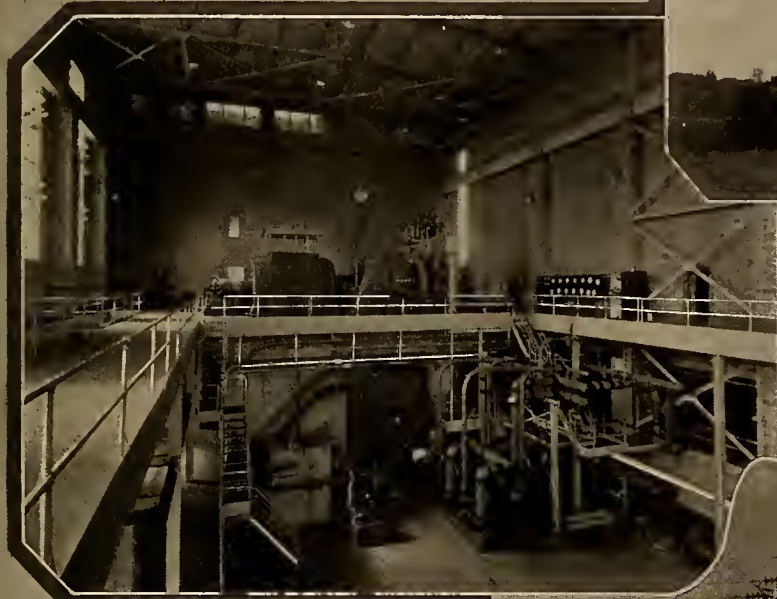
Characteristics of the coal originating in mines within a radius of ten miles or so from the plant differ chiefly in their moisture content and ash proportions. The full flexibility of the fuel-burning equipment makes it possible to benefit by taking up attractive offers of coals of poor grade that have become more or less of a drug on the market. Prior to the decision to use these grades of pulverized fuel in the plant, exhaustive tests were made on the lignite to ascertain its value for fuel and its adaptability to pulverization. Several carloads of the intended fuel were shipped to existing pulverization plants in various parts of the country and a detailed study made.

Four Bigelow-Hornsby unit-drum type boilers of 1,300-hp. normal rating make up the present battery.

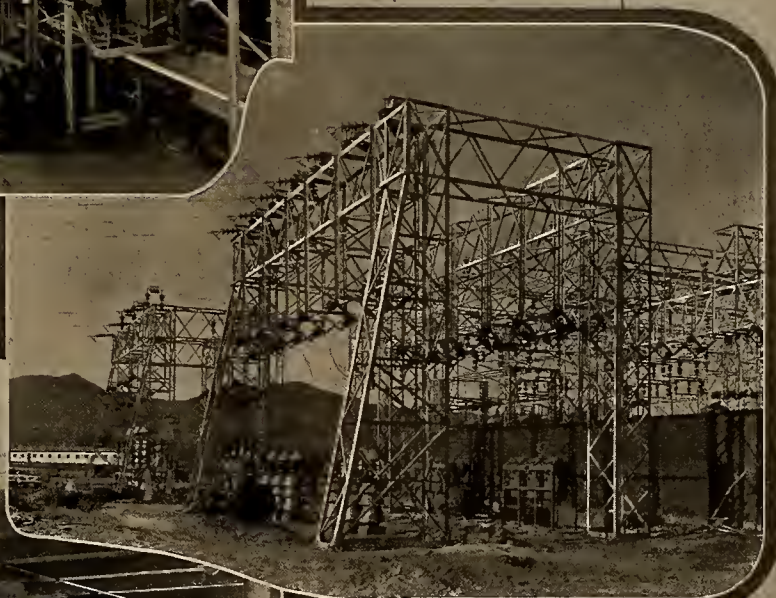
SEVERAL features make the new Valmont steam plant of the Public Service Company of Colorado one of the most unique in the West. It burns pulverized coal as fuel; it is situated upon an artificial body of water from which water for condensation purposes is derived. The accompanying photographs show some of the features of the plant. No. 1 is a view of the 90-kv. transmission line from the plant to Denver. No. 2 shows the turbine room with 25,500-kva. Westinghouse turbo-generator in the far end. Provisions have been made for the installation of a second unit of this capacity in the present building. The ultimate capacity will be five units. A view of the switchboard adjacent to the station is shown in No. 3. The control room is shown in No. 4. One of the features of the control apparatus is a Cory turbine order signal system, shown at the left of the operator.



1



2



3



4

Each boiler has 13,200 sq.ft. of heating surface and is made up of 34 units per boiler exclusive of 10 units used as an integral economizer. A working pressure of 375 lb. and a superheat of 200 deg. F. will be maintained. The usual construction practice in setting the boilers was followed in that cold air is admitted through hollow side walls and carried to the front of the boilers where the heated air enters the furnace. Ashes and slag are removed to an ash pit by means of sluicing. Primary air is provided by four motor-driven Sturtevant fans, with one emergency steam-driven fan.

Feed water is supplied from either or both of two

feed lines. This water is admitted into each end of a header serving each boiler and from which five 2-in. supply lines deliver water to the economizer sections. Regulating valves control the flow of water into these headers. The feed pumps draw upon the storage of deaerated water in the deaerator and pump through the 55-deg. bleed heater, and thence to the boiler units. Feed pumps are steam-driven while all of the other auxiliary equipment is electrically driven.

Water is required by the boiler room flows from a high-level surge tank, which collects all retrieved condensate as well as make-up water, and passes first through the air ejectors and then through the 140-deg. and the 200-deg. bleed heaters. The 200-deg. heater serves as a regulating heater under the control of a thermostatic regulator such that the outlet temperature when combined with the amount of steam available in the deaerator will maintain a uniform temperature at this point of 206 deg. F. This temperature is taken as the controlling temperature for proper deaeration of the feed water.

Each of the four boilers discharges steam into one main header serving the main turbine unit. Before entering the turbine room an anchored cross is provided which serves also as a portion of the auxiliary is taken. The other side of this cross will provide for cross-connection with other boiler units of future installations. A system of header drainage is provided which serves also as a portion of the auxiliary steam header. This arrangement allows the opera-

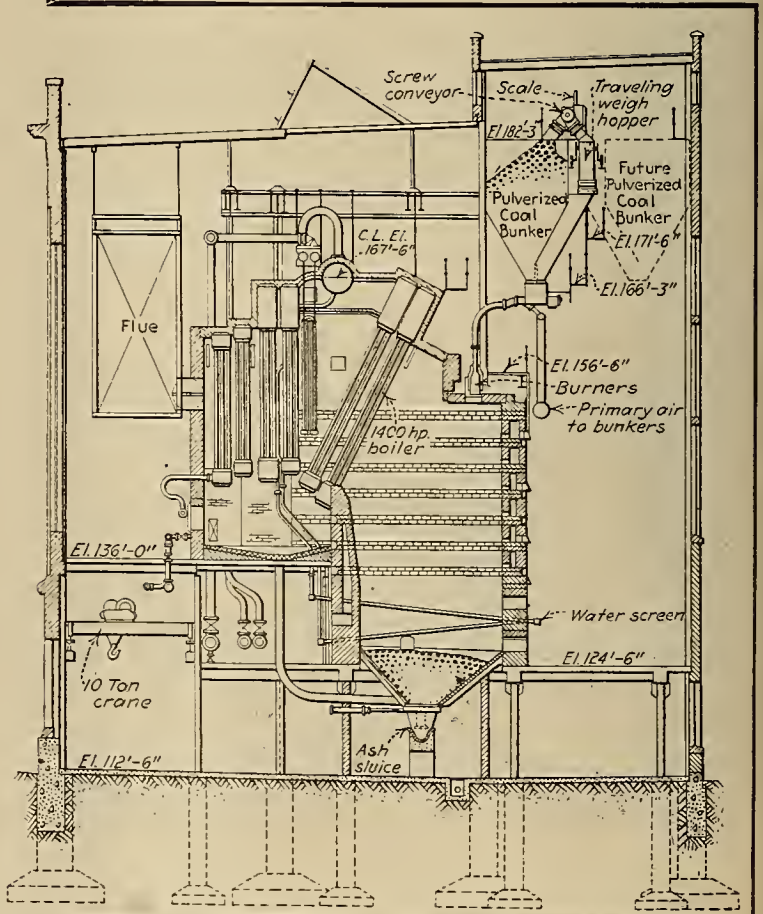
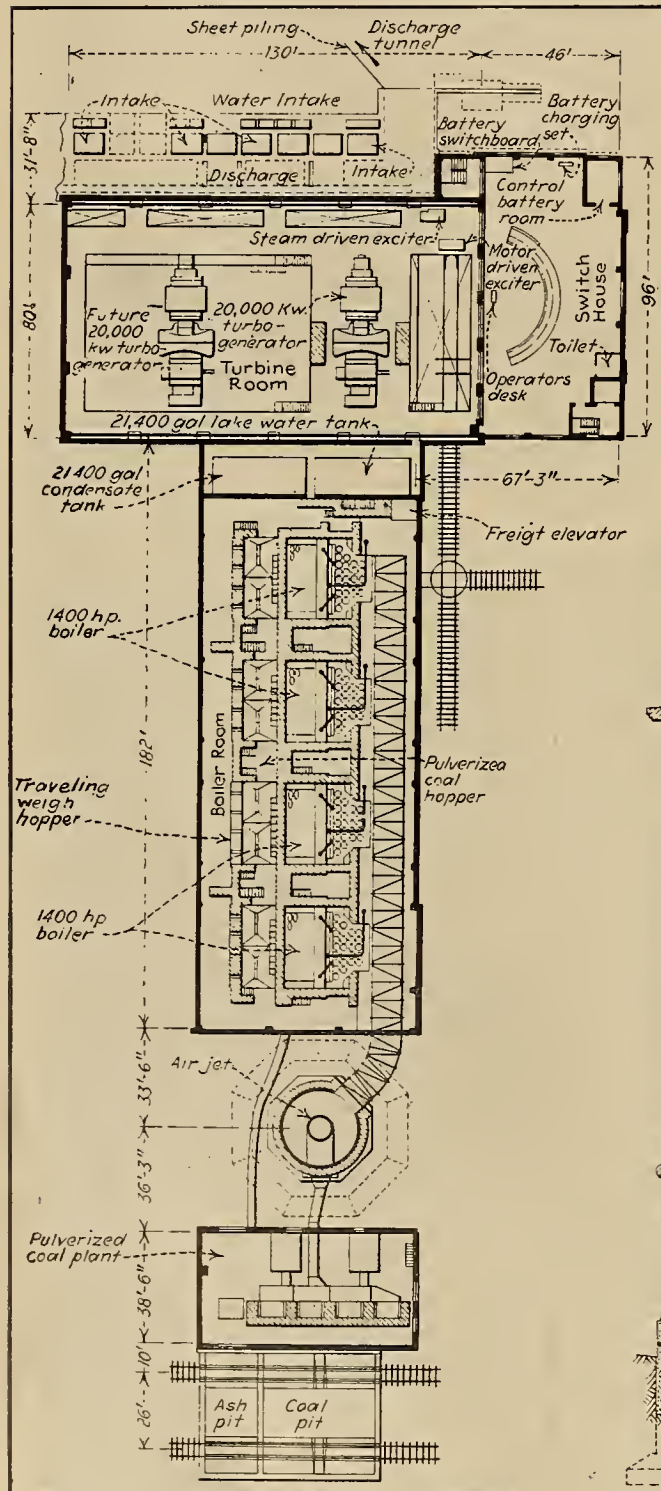


Fig. 1—Cross-section and plan of power house

tion of auxiliary equipment by any one boiler should such be necessary when the main steam header is out of service.

Circulating water equipment consists of two bi-rotor centrifugal pumps, one motor-driven and the other duplex-driven by steam turbo-gear and motor. Each pump is rated at 18,000 g.p.m. at 490 r.p.m. Condensate is removed by either of two centrifugal pumps, one of which is motor-driven and the other of which is steam-driven. Air removal equipment consists of a motor-driven LeBlanc air pump and also a duplex bank of steam-driven air pumps.

Burners

Choice of fuel-burning equipment was based upon the ability to burn Colorado fuel and upon ability to pick up sudden increases in load often ranging from floating capacity to fuel-generating capacity. Experience with every other type of fuel-burning equipment from hand-fired grates to the most recent developments in underfeeds and forced-draft chain grates proved that Colorado lignite cannot be burned with low ash pit losses to obtain more than normal boiler ratings. Underfed stokers proved their ability to accelerate at the rate of 10 per cent per minute, but their operation was at the cost of operating economy. Therefore, after weighing all considerations and in spite of higher initial investment, pulverized fuel-burning equipment was selected.

Turbine Equipment

The main turbine is a horizontal unit and designed to operate at a steam pressure of 350 lb. and a superheat of 200 deg. The bleeder system is used, four different stages of bleeding being used for feed water heating. In the process of heating, the feed water goes to the after condenser, to the low-pressure heater, to the intermediate-pressure heater, to a de-aerator and open feed water heater in one unit. From this point water goes to equalizing tanks and then is fed into the boilers at a temperature of approximately 290 deg. F. through five-stage steam-driven boiler-feed pumps.

The condenser is attached rigidly to the turbine and provides 30,000 sq.ft. of cooling surface. It is served by two Westinghouse circulating pumps, each having a capacity of 20,000 g.p.m. One of these pumps is motor-driven and the other is equipped with a dual drive connected through a magnetic clutch. The condenser also is equipped with a Westinghouse-LeBlanc air pump for emergency operation.

Electrical Equipment

A 25,000-kva., 13,800-volt, 3-phase, 60-cycle, star-connected Westinghouse generator is driven by the main turbine unit. Excitation for the generator may be supplied either from a direct-connected exciter or from a 35-kw. motor-generator set and storage battery in parallel. The latter is for emergency service. Automatic voltage regulation is obtained by the use of a rheostatic voltage regulator operating in series with the main field. This allows a constant voltage to be maintained on the exciter bus and, while it is somewhat slower than the contact-making regulator operating on the exciter field, it is less sensitive to

system disturbances and is believed to be more reliable. At present no load-limiting or synchronizing reactors are installed, but space for them has been provided on the first floor of the switch house.

Switching equipment for the 13,800-volt bus is located in a switch house at the end of the turbine room. All incoming and outgoing leads enter the switch house through the first floor, and consist of single-conductor, varnished-cambric-insulated cables laid in fibre ducts cast in concrete slabs. Outgoing leads and control circuits for the outdoor equipment leave the switch house through a cable tunnel built above grade through the outdoor switch yard.

It may be seen from the one-line diagram shown in Fig. 2 that the conventional, grouped-phase arrange-

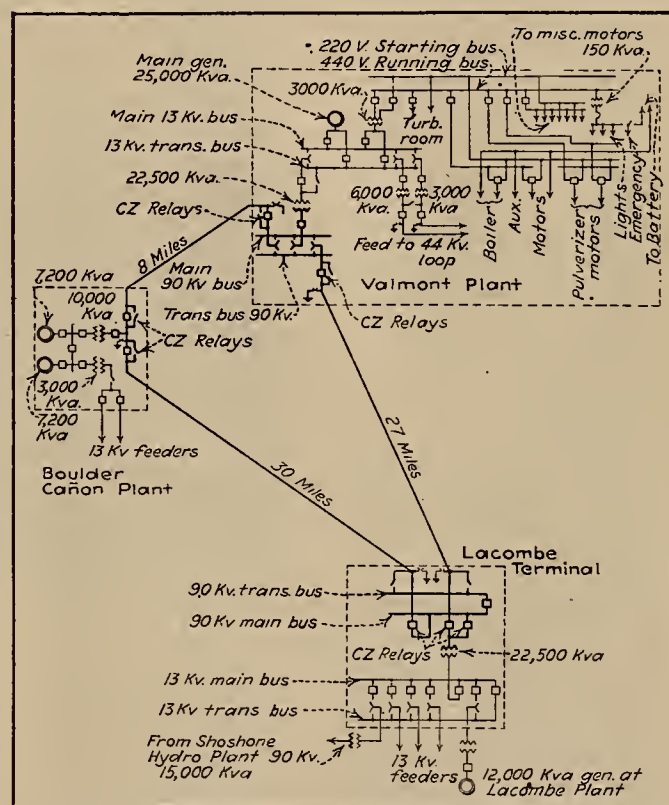


Fig. 2—One-line diagram of plant and contiguous system

ment of a main and a synchronizing bus was used. Both buses are located on the third floor of the switch house. Three-pole, 25-kv., Westinghouse type C022 oil circuit breakers are used for all 13-kv. switching. As shown on the diagram referred to above, station light and power is supplied from a bank of three 1,000-kva. transformers located on the ground floor. This bank is large enough to carry the entire station load operating open-delta. These transformers step down from 13 kv. to 440 and 220 volts. The 220-volt connection supplies the starting bus only. All station auxiliary motors, including coal preparation and handling machinery, with the exception of the boiler feed motors, are supplied from this bank at 440 volts, 3 phase. Station lights are supplied through 440/220-110 volt, single-phase transformer. The boiler feeds are driven by 220-volt d.c. motors supplied from the station battery. Direct current for charging this battery normally is supplied from a 35-kw.

motor generator set, but may be supplied from the exciter. Station lights automatically are thrown onto the station battery in the event of an interruption to the a.c. service. All auxiliary motors are push-button controlled and provided with "stay put" starting buttons so the motors will be restarted automatically after an interruption to the house supply service. The control board for the station auxiliary is located in the turbine room on the ground floor, just below the main turbine floor.

A bench type switchboard is located on the fifth floor of the switch house. From this board are controlled the generator 13-kv. breakers and the outdoor 44 and 90-kv. breakers. Private telephone connection with all points on the system is available as well as Bell connections and an inter-phone for house communication. Control and signal conduit terminate on a "half floor" just below the control room. Access to this space is from a shaft extending the full height of the house.

Transmission

All circuits are fed from the station to the outdoor bus structure through a conduit tunnel. There the voltage is stepped from 13,200 volts to 90,000 volts through one 22,500-kva. bank of transformers. At this latter potential current is fed into the main transmission system which supplies Denver and other communities. This same system is tied in with the Boulder Canyon hydroelectric plants, the Shoshone hydro plant on the western slope of the Rockies, and the Denver steam plants. The most important load point on the transmission system is the Terminal substation, which is situated some two miles inside of the corporate limits of the city of Denver.

The Valmont-Denver 28-mile, 90-kv. line is strung with 336,000 circ-mil. aluminum cable, steel reinforced, carried on double-circuit towers with 12-ft. vertical spacing. The same conductor was used on the 8-mile line to Boulder Canyon. The third side of the transmission triangle, from Boulder to Denver, is made up of a similar line 30 miles in length.

Seven 10-in. Ohio brass disk-type insulators are used in suspension strings and seven 11-in. disks are used for dead-end and semi dead-end strings. The maximum span is on the Boulder Canyon line and is 2,200 ft. long.

Two 44-kv. lines also take off from the outdoor substation and supply a 125-mile loop which furnishes energy to nine substations in northern Colorado where the power is distributed to cities and towns and other power users, such as mining and pumping installations. The 44-kv. bus is supplied from the 13,200-volt bus through two banks of transformers totaling 9,000 kva. The 44-kv. lines leave the plant on double-circuit steel poles and are carried on pin-type insulators. This twin-circuit line extends about three miles from the plant. From that point each line takes off to form its side of the above-mentioned loop.

The Denver terminal substation is an outdoor structure of up-to-date design and serves as the

focal point of the system, the dispatcher being located there. The location is adjacent to one of the company's older steam plants. At this point the voltage is stepped down to 13,800 for distribution throughout the city to local substations.

General

Plant design was by the engineering department of the Cities Service Company of New York City under the direction of G. W. Saathoff. Local construction was carried on by the Lakeside Construction Company, a subsidiary organized especially for the project by the construction department of the Doherty interests.

The cost of the first unit was nearly \$4,500,000. An additional \$500,000 was spent on the transmission lines to the Boulder plants and to Denver. Water rights, ditches and other similar developments have cost another \$500,000 to date. A total of 940 acres of land was acquired by the company for the project.

The first unit was placed in operation about the first of the present year and has operated unusually well for a new plant. It is being run at a capacity of 400,000 kw-hr. per day. The second unit probably will be placed next year. This unit will require no additional building or boiler installation as these already have been provided. The tentative program for next year also calls for the construction of the largest of the several dams required for the reservoir enlargement. This dam is to cost approximately \$600,000 and will take about a year to construct.

Normal plant operation consists of all motor-driven auxiliaries except the feed pumps, yet the steam-driven equipment is sufficient to permit operation should system disturbances affect the station source of supply when the turbine unit is out of service.

Some effort has been made to insure a steady flow of energy from the plant as the following summary will show. Two railroads serving many miles supply the plant. The plant has a locomotive crane with a boom sufficiently long to permit it to place coal in the main bunker of the preparation house in the event that the main crane breaks down. There are four pulverizing mills, duplicate coal conveyors and multiple feeder units on each boiler. One of the primary air fans on the pulverized coal feeders has been equipped with dual drive. Four boilers allow for plenty of capacity with one out for repairs. Feed pumps, circulating water pumps, condensate pumps and exciters all are in duplicate. The plant is connected to two loop circuits, the 90-kv. loop transmission serving Denver and the 44-kv. loop transmission serving the several cities of northern Colorado.

The plant is particularly fortunate in having a very good supply of make-up water for boiler feed. A connection for this purpose was made to the mains of the city of Boulder. This community obtains its water from a melting glacier, and diversion is made before the water has passed over anything more than granite rocks. This accounts for the absence of evaporators or feed water treating systems.

Future Electric Transmission

An Interview with Dr. Harris J. Ryan

By Andrew R. Boone

Stanford University, California

PICTURE one copper or aluminum wire, reaching from the Canadian border the length of Washington, Oregon and California to the Mexican boundary, passing the metropolitan areas close enough to be "tapped" and electrical power drawn off for Pacific Coast motors and electric lights

Idle dream? In essence such a great power line will feed the far West within the next two decades, for a rapidly growing population will demand development of all the first line water powers on the Pacific Coast. Steps are being taken now to solve the problems that the construction of such a line and the distribution of electricity in concentrated loads will present.

At Stanford University the Ryan Electrical Laboratory, built in honor of Dr. Harris J. Ryan, past president of the American Society of Electrical Engineers and head of the electrical engineering department there, will be installed this year. This is no ordinary laboratory. It will be capable of sending into a single pair of two-inch hollow conductors 2,100,000 volts of electricity. To date the largest power lines in practical operation carry electricity from Pit River to Vaca-Dixon for the Pacific Gas and Electric Company, and from Big Creek near Huntington Lake to Eagle Rock and Laguna Bell, for the Southern California Edison Company. Their normal voltage is 220,000, the highest in the world, yet little more than one-tenth the voltage to be played with in the unsightly buildings in a small valley south of the Stanford University campus.

Because unsightly, the laboratory virtually will be hidden from casual eyes. It will be located in the valley between Pine Hill and the Mayfield reservoir hill and will house six 350,000-volt transformer units, manufactured and given to the laboratory by the General Electric Company. Leading from these units will go a transmission line 8,000 ft. in length, 2 in. in diameter and hollow (hollow to facilitate



DR. HARRIS J. RYAN

who believes "that the time will come, perhaps ten or fifteen years hence, when economic necessity will require the development of all major water powers of the Pacific Coast. Utility companies will be called upon to serve concentrated loads of 1,000,000 hp. to metropolitan areas. We will have a single electric transmission extending from the Mexican to the Canadian border. We must solve the problems of that day now."

measurement and to lessen weight and expense). A 300-ft. right-of-way will guard the unwary from its dangers.

Instead of the customary towers, a line of steel masts, each 125 ft. in height, will be erected on each side of the right-of-way. Cables will be strung from these masts so that the transmission line may be hung according to varying experimental demands. A telephone line will stretch the entire distance for communication studies. After the initial experiments are under way the experimental line may be increased in length to seven miles, skirting the edge of the 8,000-acre campus.

All for studying and getting ready for the Far West's electrical needs a few years hence. But why toy with 2,000,000 volts when practical needs will be limited to little more than one-eighth that total for many years?

"It is quite as important to learn that we cannot go beyond what we know today as the practical limits as to learn that we can handle the apparently impossible," Dr. Ryan explained.

"Laboratory voltages should be studied beyond the practical limits in order that we may familiarize ourselves with those things which might put an operating power line out of operation and throw the Pacific Coast into darkness. In lines carrying more than 220,000 volts (at 60 cycles) the magnetic and electric fields become too big; to mobilize these fields would require station capacities too great.

"To handle operating voltages successfully, we must be able to take care of all predatory, unexpected actions. Lines must be insulated and maintained for voltages several times as high as the normal operating voltage. For instance, the two heavy lines leading from Pit River and Big Creek were attempted only after 220,000-volt equipment was tested and studied in a laboratory with voltages up to a half-million, to insure safety.

"To bring power to San Francisco from the Colorado River region will require voltages higher than 220,000. In such a laboratory as ours we will study all the possibilities by which higher voltages may be employed.

"The time will come, perhaps ten or fifteen years hence, when economic necessity will require the development of the major water powers of the Pacific Coast. Utility companies will be called upon to serve concentrated loads of 1,000,000 hp. to metropolitan areas. The interconnection of all large operating companies will come as a natural consequence. We will have a single huge electrical power line extending from the Mexican border to the Canadian boundary, with 'tap-ins' from local water powers and 'tap outs' to customers who wish to buy current. We must solve the problems of that day now.

"Sixty per cent of the available water power of the United States is located on the Pacific Coast and the adjacent back country. The sources of these corresponding water powers generally occur at the highest elevations, often 100 to 200 miles or more from their corresponding market centers.

"The growth of Pacific Coast populations, their markets for power and their distance from the water power sources are all interdependent factors. It is a reasonable assumption that by 1935 all of the water powers within economic reach of the bay region will have been developed and put to use, employing a transmission voltage of 220,000. While the metropolitan areas of Los Angeles, Portland and Seattle are within economic reach of the huge water-power reserves of the Colorado and Columbia Rivers, the strength of the entire far West will be required to develop and market them.

"Such undertakings can be realized only through interconnection of all great powers and markets generally throughout the far West. These interconnections will require far greater transmission distances than those heretofore accomplished.

"The progress of the far West is extraordinary and has been made possible only through economic power and communication. If such progress is not to be greatly reduced after ten years, adequate corresponding advances must be made in the technical knowledge of the high-voltage factors involved in the general interconnection of the power sources and markets. It is the manifest duty, therefore, of all responsible for the progress of the power industry of the far West to cooperate in educating and training the men and accomplishing the researches requisite for the development and application of the adequate knowledge required to accomplish effectively and economically the entire power market interconnection throughout this vast section of our country."

Professor Ryan sees little reason why some method for handling heavier electrical loads cannot be worked out. One of the first questions to be decided is whether "we shall increase the voltage, lower the frequency or change from alternating to continuous current."

The possibilities of general Pacific Coast interconnection of power sources and markets first were visualized following experiments in the present Stan-

ford high-voltage laboratory, now outgrown. After the suspension-type insulator for 110,000-volt power lines proved successful, Stanford erected the present laboratory in 1913, and in it five years ago were begun a series of researches, the outcome of which provided a successful insulator for the 220,000-volt lines. Before the 220,000-volt problems had been solved, the insulator for the 165,000-volt lines of the Great Western Power Company, from Big Bend to Oakland, and the first 100,000-volts to earth insulating supports for the radio aerial at Pearl Harbor, T. H., were developed in this pioneer laboratory in cooperation with the engineers in charge of those projects.

During the last decade these and other researches brought about a closer cooperation between Stanford and the power companies, leading to establishment of the Ryan Electrical Laboratory, a tribute to Stanford's electrical genius.

Through researches, in cooperation with the electrical engineers of all the large power companies, and graduate students at Stanford, Dr. Ryan hopes to learn how to develop all the water power of the far West and bring the power to market—despite great losses of power incidental to transportation over long distances in varying weathers and to "predatory high-voltage phenomena, among them switching, breaking short circuits, arcs, engine or turbo-generator runaways, resonance, lightning, too-small conductors, failure of insulators and flash-overs."

To date the conclusion is that the best transmission voltage is 220,000, the present maximum, with which power can be transmitted satisfactorily over distances varying from 250 to 500 miles and more.

As to the possible availability in the future of high continuous voltage of 500,000 or more, "an open mind should be maintained," said Dr. Ryan. "Responsible manufacturers are engaged in the solution of this problem," he explained. "We may expect them to be successful, but with some changes in the method of distribution.

"Whatever success we achieve will be based partially on experiments in the new laboratory, which will be a light-proof building. The main laboratory building will be constructed entirely of steel. Its length will be 173 ft. and width 80 ft. The roof will be supported on trusses so as to leave the interior free of supporting columns. The height from the concrete floor to the underside of the trusses will be 50 ft. The long sides of the main building will face north and south. The side to the south facing the line right-of-way will be equipped with three large square doors measuring 40 ft. on each side, out through which to extend the high-voltage source-terminals for the delivery of 2,100,000 volts single-phase, 1,200,000 volts three-phase, and lesser voltages by arrangement as required.

"Fifty feet of the west end of the main building will be occupied by the equipment now used in the old laboratory. Its use will be continued for elementary instruction and for researches requiring the use of comparatively low-voltage sources. The rest of the main building using a floor space of 120x80 ft. will be employed for placing and using six 350,000-

volt transformer units. They will weigh 22 tons each and have been so designed and constructed that they may be used in every manner of connection for the whole range of voltage, single or polyphase, within the limits named above.

"For safety to life and equipment in the use of these high voltages it has been found necessary to provide 20-ft. clearances everywhere about the main electrodes and corresponding points of application of the voltages to avoid discharges or destructive arc-overs. This is the chief reason for the large doors through which to connect to experimental lines or other test specimens in the open and for the large interior space for work indoors.

"Adjacent to the north side of the main building there will be erected a much smaller building of concrete to contain the requisite power plant, power and voltage control facilities, offices and instruments, equipment, photographic dark and seminar rooms. The power plant will contain two 900-kva. sine-wave, three-phase generators driven direct-connected by two 500-hp. synchronous motors. While the maxi-

mum power capacities are large—2,100 kva. in transformers, 1,800 kva. in generators and 500-hp. in motors—the total annual cost for power consumed will be comparatively small because of the short duration through which large amounts of power will be required for study and test purposes.

"In anticipation of the provision of this high-voltage laboratory at an early date, the faculty and graduate students of the department of electrical engineering during the past three years have been engaged steadily upon the problem of the development of a satisfactory wattmeter for the segregation and measurement of the power losses that will occur from the 1,000,000-volt, three-phase circuits to the atmosphere and over the supporting insulators. Excellent progress has been made in this undertaking, and the final success of the 1,000,000-volt three-phase wattmeter used in direct connection with the test lines now is reasonably well assured. Such wattmeter stands in much the same relation to the high-voltage laboratory as does the precision reflector telescope of the modern astronomical observatory."

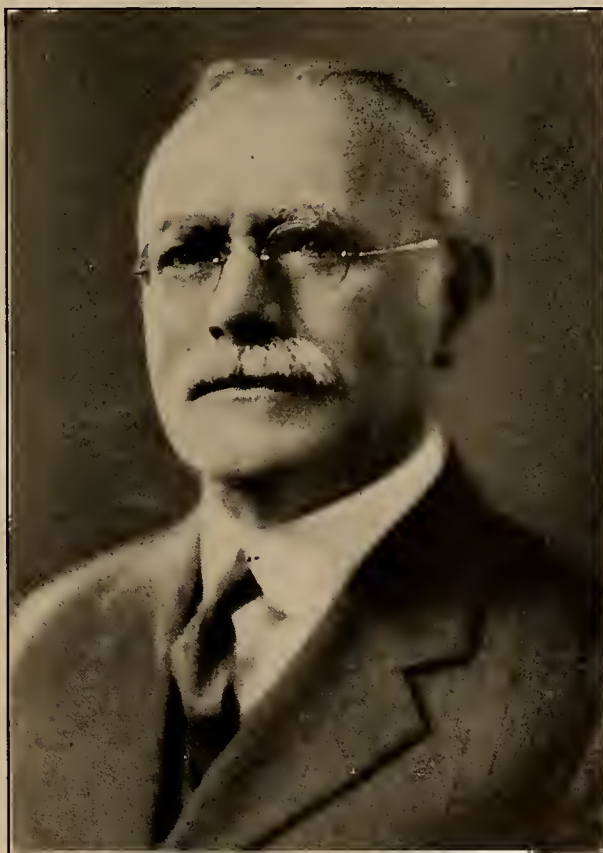
The Same Job—A New Crew

By William Baurhyte

President, Pacific Coast Electrical Association

THE aims and policies of the Pacific Coast Electrical Association are so firmly established and well understood among our membership that a change in Association officers does not imply an annual revision of purpose or turning aside from the proven path to chase the butterflies of individual caprice across the inviting meadows of unconsidered experiment. It is not the annual tearing down of what was built last year in order to erect a new structure of different design on the same ground. Rather, it is a change of shift on a big job—one crew has gone home for rest and recreation; another crew has taken up the tools of the task, to be relieved later by still another crew, yet unchosen. Different crews, but the same job and the same general design.

Therefore the plan of the newly elected administration will be to carry on the work of the Association and promote the advancement of the industry along the lines so successfully followed last year under the very able leadership of



WILLIAM BAURHYTE

who tells of his aims for the Association which he leads during the present year.

Frank A. Leach, Jr., our retiring president. We shall seek to develop and strengthen every branch of Association activity, in the confidence that conscientious effort along right lines will yield the golden fruit of success to our industry and satisfying service to the great public for which we carry on.

The work of the Association is done largely by the various Sections called for by our plan of organization. The membership of the committees composing these Sections totals approximately 600, all experts and specialists in their lines. Most of them are already vigorously at work. To each Section is committed its own special task. What they shall accomplish during the year is beyond the present knowledge of the president and largely outside of his control. From the nature of the case, the Sections specialize while the president must generalize.

Our reliance and confidence rest with the Sections.

Some of the tasks confronting the Association may be stated in a general way.

We hope to increase our membership and build up the organization to keep pace with the growth of the industry.

The Technical Section has the task of improving service and providing it at lower rates. Great improvement has been made recently in steam-driven apparatus. Strides have been taken in the transmission of electricity at high voltage, and experimental work is still in progress. Central-station companies are making great expenditures for water power development to the end that the community may be served adequately and efficiently.

Recent improvement in alternating motors greatly has diminished the necessity for direct current. Economy of operation and the consumer's interest both lie in the direction of keeping the demand for direct current down to the minimum. Sales and engineering forces, both in the central stations and among the dealers in motors, should not be permitted to lose sight of this fact.

The greater use of combination poles is to be encouraged. One step in this direction would be taken if arrangements could be made with the telephone companies that higher voltages might be combined with telephone lines. This same problem is under attack in the East.

Standardization of apparatus and uniformity of current characteristics are highly desirable as a means of facilitating super power, with its economies and assurances of uniform service.

One of the most unfortunate things that has happened to the electrical industry in recent years is the public misunderstanding of the purpose of the power companies in their efforts to achieve superpower and the accompanying unfavorable publicity. The consumer's interest lies parallel to that of the central-station companies in the encouragement of superpower development. The Association must find a means of nullifying this unfavorable publicity.

The increasing importance of courtesy as an accompaniment of service is receiving more nearly its due recognition in all quarters. The success of the "Smiles" movement, the preparation and use of manuals for employees, and the emphasis placed on courtesy in hundreds of spoken and written discussions all testify to the interest being taken in this vital subject. Good service at a fair rate, courteously rendered, is the basis of all opposition to municipal ownership.

Our Public Relations Section undoubtedly will continue the good work already done in the interest of customer-ownership. As a happy combination of financial and public relations policy, customer-ownership constantly is giving fresh evidence of its value to utility corporations so that on the Pacific Coast at least the problem is not that of interesting company executives in customer-ownership, but rather the development and refinement of the methods of its application.

The Public Relations Section is very fortunate in the fact that A. B. West, president of The Southern Sierras Power Company, has accepted the chairmanship of the Section and will take an active part in that very important Section. The Association is to

be congratulated that Mr. West is again able to assume his place as one of its active workers and supporters.

The Commercial Section made an excellent record of accomplishment last year, and the prospects are that the present year will measure up fully to that standard. As public servants charged with the obligation to give the best possible service at the lowest possible rates, we shall have constantly in mind the necessity of the fullest cooperation and co-ordination of aim and effort on the part of the manufacturers, the dealers and the central-station operators. The field of usefulness for electricity is almost unlimited, and it is for us to overcome the obstacles now preventing its wider uses. Cheaper appliances must be found in some instances, cheaper current furnished in others, and proper education alone in many others. With every branch of the industry working in harmony we shall succeed in making it the ever-increasing boon to humanity that it is destined to be.

The selection of a Pacific Coast man as president of the National Electric Light Association and the holding of the national convention here in June were together a compliment which has given a great impetus to our work and left a train of benefits impossible to estimate.

California Ranks Second in Developed Water Power; Washington, Third

THE Department of the Interior, through the Geological Survey, has just released a report on the developed water power of the United States in 1925. The total capacity of water wheels installed in plants of 100 hp. or more, in March, 1925, was about 10,038,000 hp., an increase of about 951,000 hp., or nearly 10½ per cent, over the total capacity of water-power plants in 1924 (9,087,000 hp.). Of this increase 99 per cent was in electric public utility plants and 1 per cent in manufacturing plants.

New York continues to lead the rest of the states in the amount of developed water power. The five leading water-power states in order of their rank and the amount of developed water power for each are as follows: New York, 1,713,551 hp.; California, 1,531,480 hp.; Washington, 560,693 hp.; North Carolina, 534,600 hp.; Maine, 476,627 hp. North Carolina has moved from fifth place in 1924 to fourth place in 1925.

The report also contains records of the developed water power for 1924 and 1921 and the estimates of potential water power for 90 per cent and 50 per cent of the time computed in 1924. Based on present practice at fully developed water-power sites the undeveloped water power in the five states leading in developed water power will permit of the installation of the following additional capacities in water wheels: New York, 4,734,000 hp.; California, 7,145,000 hp.; Washington, 9,672,000 hp.; North Carolina, 526,000 hp.; Maine, 920,000 hp.

The report indicates that water-power development in the middle Atlantic, south Atlantic, and east-south central states is progressing more rapidly than in any other sections of the country. New England's relative standing continues to decrease.

Dough—Kilowatt Hours—Dollars

By E. L. Gehman

Manager Rainier Electric Oven Department, J. A. Campbell Company, Seattle

IT is said that in 1825, when a bill for the construction of the first railroad line in England was introduced in the British Parliament, one Thomas Creevey, expressing the popular sentiment of the day, objected as follows: "I have come to the conclusion that our Ferguson is insane. He quite foamed at the mouth with rage in our railway committee in support of this infernal nuisance—the locomotive monster, carrying 80 tons of goods, and navigated by a tail of smoke and sulphur coming through every man's grounds between Manchester and Liverpool. . . . Well, this devil of a railway is strangled at last . . . today we had a clear majority in committee in our favor and the promoters of the bill withdrew it and took their leave of us."

It has been written that at the time that bathtubs first were installed in this country, about 1840, the newspapers were bitter in denouncing them as extravagant and undemocratic, and even doctors criticized them as being unhealthy. Disapproval finally led to legislation to the extent that special licenses and taxes were attached to the unsuspecting bathtub. It is claimed that Virginia put a tax of \$30 a year on them in 1843 and that two years later an ordinance was enacted in Boston making bathing in them unlawful except as prescribed by a physician.

Ridicule always has been a popular and handy weapon. It might have caused an early death or at least a much arrested development of the electric bake oven but for the vision and enthusiasm of a few. As recently as three years ago a great many bakers took the attitude that electric ovens were toys and wholly impractical for all heavy-duty work. Today there are thousands of them in use in all kinds of bakeries.

The Bake Oven a Desirable Load

To the central station this electric bakery load is an important factor. Progress in the development of this class of installation has been made, and indications are that greater attention will be paid to it in the future. System load factor is bettered by this load, which is largely of an off-peak character, and its revenue-producing qualities give it increasing importance in the eyes of commercial department managers.

W. R. Putnam, last year's chairman of the Commercial National Section of the N.E.L.A., recently

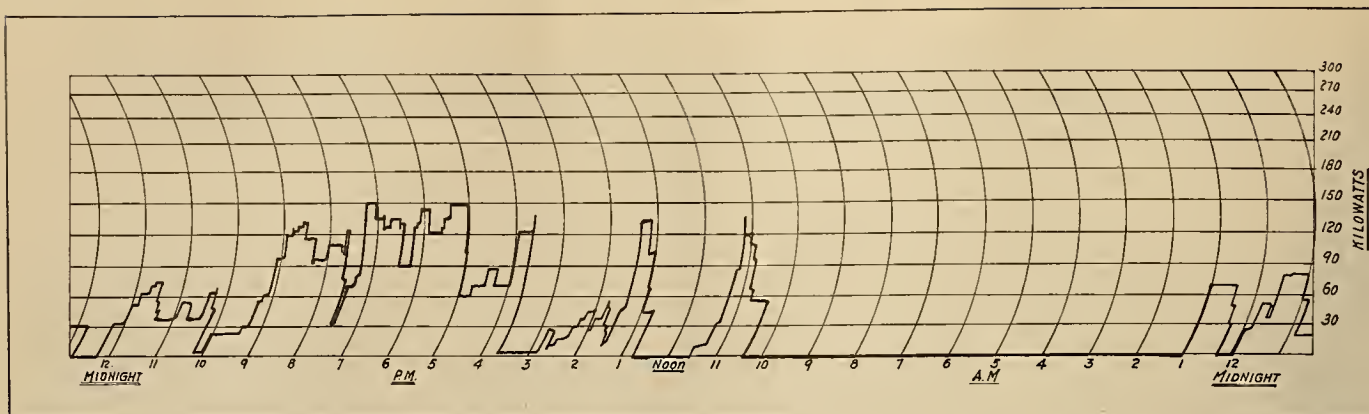
A growing load in the territories of Western utility companies, but one still in its infancy, is that of the bake oven. The potential business has been only scratched. Mr. Gehman has been one of the pioneers on the Pacific Coast in developing this business, and here presents some ammunition to supply the oven and power salesmen in their attacks on the bakers' strongholds when attempting to introduce electricity into an old-fashioned bakeshop.

said in part: "The most urgent problem confronting central station men is that of so directing their load-building efforts as to raise the system load factor, and by this increased efficiency offset the higher unit investment cost and increase in operating expenses." A writer in the March 21 issue of *Electrical World* stated, "Commercial electric cooking load is particularly desirable to the central station because the load factor is as good as and often better than the average industrial load, and it operates practically at unity power factor." If this is true of commercial cooking, it is even more true of electric baking, a specialized branch of cooking, as most baking is done during off-peak hours, thus improving load factor and tending to fill in the daily valleys in the load curve.

The Electrical Oven Desirable from Baker's Standpoint

In addition to being a particularly desirable load to the central station, the electric bake oven is an especially desirable and modern facility in the bakeshop. It can be said truly that the electric bake oven is to the baking industry what the automobile is to transportation. The electric bake oven has met the stiffest requirements of both the retail and wholesale baker. It is manufactured in sizes ranging from the small laboratory oven to the traveling oven designed to meet the demands of the largest wholesale baker. Illustrative of the practicability of the electric traveling oven for the larger plants is the recent installation of one of these in the new plant of the Bake-Rite Bakery, Portland, which makes a diversified line of bakery goods, including everything from lady fingers to three-pound loaves of pullman bread. The electric traveler allows the large baker the advantages of electric baking and combines these advantages with those of the traveling oven, an ideal combination. No special costly foundation is required for the electric traveling oven, while this item alone represents a considerable investment in the case of traveling ovens of other types.

For one of the world's oldest lines of business, baking has been very slow in its progress and improvement. It is only within the last few years that great strides have been made, and this has been the result of scientific study. This advancement has attracted a more intelligent type of men to the baking



Graphic demand record of Rainier electric traveling oven at Bake-Rite Bakery, Portland. The oven has a baking surface 60 in. wide and 45 ft. long and a capacity of 1,320 loaves an hour. Average cost of baking a 1-lb. loaf is \$0.00119.

field, men with higher ideals and better trained in merchandising, who were quick to realize the place of importance the oven holds in the shop. They have realized that it is the most necessary piece of equipment in the bakery—the only one they must have to operate a bakery. Now that the prominent part the oven must take in the successful operation of a bakery is being appreciated, it is receiving more consideration from the practical baker.

Keen competition is responsible for the necessity of cleanliness in the shop, and since the old types of ovens are the cause of most of the uncleanness, it is the exception, rather than the rule, for a baker to omit consideration of an electric oven, when he is opening a new shop or buying a new oven. The only objection to the electric bake oven, in the mind of the baker, is the cost of operation, and there is hardly a baker who would not install an electric oven on account of its cleanliness alone in preference to any other type, if the operating costs were apparently equal. The truth is, however, when all things are considered, the use of the electric oven actually effects a saving.

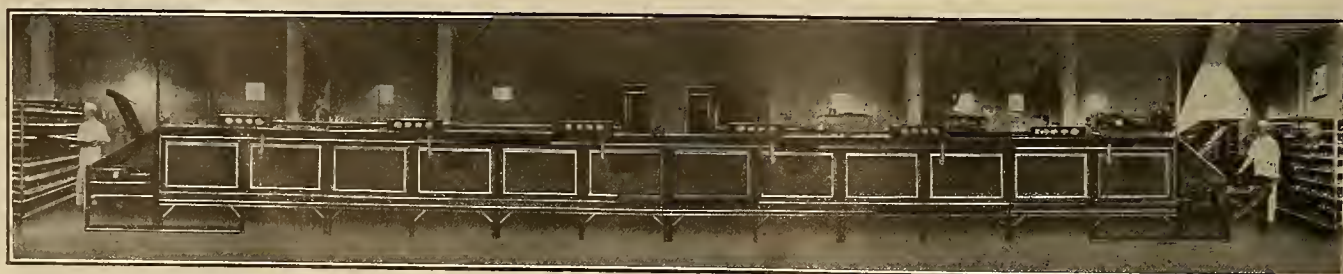
The High-Cost-of-Operation Myth

The baker must be convinced that no fuel oven at any price can furnish service equal to that rendered by the electric bake oven, and that an oven of another type **cannot** render this service, regardless of a higher or lower operating cost. He must be convinced that the slightly increased fuel bill each month is more than offset by the efficiency of the electric oven, by the smaller floor space it requires, by the labor it saves in eliminating dirt, ashes and the cleaning of flues, by the ease with which the heat is controlled, by the saving in ingredients—an important one—and by the prestige its use gives the baker in the minds of the public.

Electric bake ovens will produce more goods per square foot of baking surface than any other oven. As the heat is under absolute control of the operator at all times, unsalable goods or cripples can be eliminated entirely. The electric oven is in every sense a continuous baker, with heat applied where and when it is needed. An example of the efficiency of the electric bake oven may be had from an installation made in Tacoma. Prior to using the electric oven, which has about 160 sq.ft. of baking surface, the baker used two brick ovens, having a combined baking surface of about 240 sq.ft. Although having a smaller baking surface, the one electric oven now does the work of the two brick ovens and takes less time to do it.

To the baker who leases a shop in the retail shopping district of a large city, where rents are high and where every square foot of floor space must be put to use wisely, the electric oven solves his problem. The baker should be shown that, strictly speaking, the cost of operation of any oven should be based not only on the fuel bill each month, but to this should be added its proper proportion of the month's rent, this to be based on the number of square feet of floor space the oven occupies. In the case of fuel-fired ovens rent on the firing alleys also should be charged. In most cases these charges alone will more than offset the slightly higher cost of operation of the electric oven.

In this connection there is the circumstance that was responsible for the installation of an electric oven in Sebastopol, Calif. The baker was using a gas oven that was not giving a satisfactory bake and as a result watched his sales steadily decline. Realizing that his oven was responsible for this decline, he concluded to install a fuel oven, after a casual investigation of electric ovens had convinced



A Rainier electric traveling oven, nearly 60 ft. long, in use at the Bake-Rite Bakery, Portland, Ore.

him that their cost of operation made them prohibitive. His shop space was so limited that he could not find room for the installation he desired, so he proposed to rent space on an adjoining lot for his oven and firing alley, with just the face of the oven in the bakery. When the cost of operation of electric ovens was explained to him and it was pointed out that the cost of firing his fuel oven plus the additional rent would equal the cost of operating the electric oven he lost no time in ordering the latter.

Operating Characteristics

Experience has shown that in the pre-heating period the rated demand in kilowatt hours is consumed by the electric oven. In other words, a period of approximately one hour with switches on "high" or two hours with switches on "medium" is required to



Two electric ovens at Sutton's Bakery, Visalia, Calif. The ovens have a maximum demand of 100 kw.

bring the oven up to bread-baking temperature. After this pre-heating period, it can be used continuously for diversified baking with an average hourly current input of 50 per cent of the maximum demand and about 60 per cent of the maximum demand when bread exclusively is baked. Economy of operation may be said to be entirely up to the operator. A careless baker will require twice as many kilowatt-hours for baking a given amount of goods, as will one who arranges his work systematically and operates his oven accordingly.

The Royal Bakery of Twin Falls, Idaho, recently submitted its operating chart covering a four-month period. While this bakery does not compare in volume of output with some of the larger plants, it is known for its thoroughness in keeping accounts and records. For this reason it is believed that the figures submitted are complete and accurate in every respect. These figures show an average baking cost per thousand loaves over the four-month period of \$1.47. Energy is purchased under a flat rate of two cents per kilowatt-hour. The daily output is from 1,500 to 2,000 loaves. In localities where rates are lower, or installations of a larger size earn a lower average rate, this cost can be reduced to as low as 87 cents per thousand loaves.

The B.t.u. Bugaboo Routed

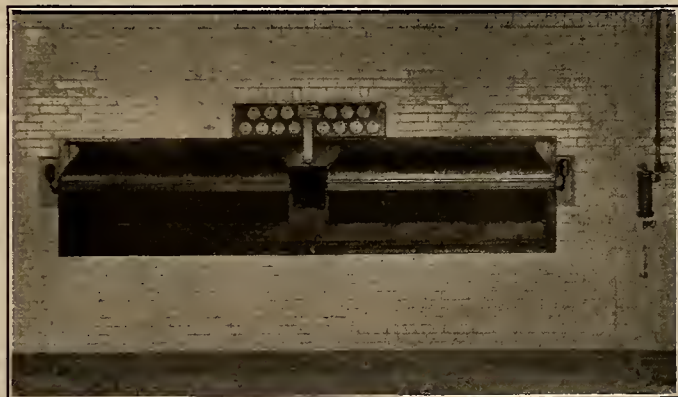
In selling electric bake ovens in competition with gas ovens the question of B.t.u. often is encountered as this is among the best sales arguments of the gas

man. The average baker does not know any more about B.t.u. than the average power salesman does about bread fermentation, but when the gas man tells the baker how many more B.t.u. there are in a dollar's worth of gas than in a dollar's worth of electricity the baker is bound to listen. In this connection it should be borne in mind that it is just a question of efficiency, and that B.t.u. have but very little to do with cost of operation.

Coal has more B.t.u. content than any other common fuel, but its efficiency is low when used in any kind of an oven. Too many B.t.u. are lost by radiation and too many escape up the flues. Oil engineers figure that fuel oil will average 126,000 B.t.u. to the gallon. Yet one engineer claims a combustion efficiency of only 15 per cent for oil. A somewhat similar statement would be true of gas-heated ovens, there being only a small percentage of B.t.u. in 1,000 cu.ft. of gas converted into useful work.

A fair estimate of the efficiency of an electric bake oven is 90 per cent. This same percentage of efficiency is not claimed for all electrically heated appliances, but the electric bake oven is particularly adaptable to high efficiency. A kilowatt-hour contains only 3,412 B.t.u., but nearly all of this heating capacity is utilized. In other words, Mr. "Baker", in operating his electric oven, is benefited by 90 per cent of the B.t.u. he buys, while with other types of ovens he can utilize but a small percentage of the B.t.u. for which he pays.

In a recent issue of one of the electrical magazines the Commonwealth Edison Company is said to have 110 installations of electric bake ovens and heavy-duty ranges on its lines in Chicago. With this statement in mind, it is somewhat interesting to



Single-deck electric bake oven, 12x14 ft. inside dimensions, at Golden Rule Bakery, Seattle

learn that there are 130 electric bake ovens alone in operation in Seattle. It is hoped that the reader will not get the impression that all the bakers in the Northwest are discarding their old ovens and fighting for electric ovens. Electric baking load has been developed by the same system that has built other loads—by 99 per cent PERSPIRATION—and by very close cooperation between manufacturers and central stations. The same whole-hearted cooperation in other territories will assure similar results. With a vision of the possibilities and a little enthusiasm there is no reason for anything short of the best kind of success.

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE



Fig. 1—An upstream view of the excavations for the Baker River dam early in the course of construction

Baker River Dam Presents Difficult Problems Several Unusual Features Involved in the Construction of Puget Sound Power & Light Company's Project

By W. D. Shannon, General Superintendent, Division of Construction and Engineering,
Stone & Webster, Inc., Seattle.

The Baker River dam, now under construction as a part of the Baker River development for the Puget Sound Power & Light Company, Seattle, is of the semi-gravity arch type with spillway through control gates over the crest of the dam. The upstream face of the dam is laid out on a radius of 250 ft. and the entire cross-section of the dam likewise is swung on the same center.

The dam is approximately 150 ft. across at the river level and the length of the crest is approximately 400 ft. The crest of the dam is divided into spillway sections 10 ft. in width in the clear. These sections will be separated by piers 18 in. wide and 25 ft. high which will be slotted and fitted with 10 x 12-ft. gates. These gates will be raised and lowered by a mechanical device which travels on the top of the piers. Gates can be kept open during the flood periods of the river and so operated during the low water period that the water in the reservoir may be conserved. The total height of the dam will be 258 ft. from bedrock to the top of gate piers, or 234 ft. to the spillway crest.

The lower portion of the dam is constructed on a vertical curve of 106-ft. radius. This curve is tangent to the apron. The total width of the cross-section of the dam at the point of maxi-

imum depth, including the apron, is 180 ft.

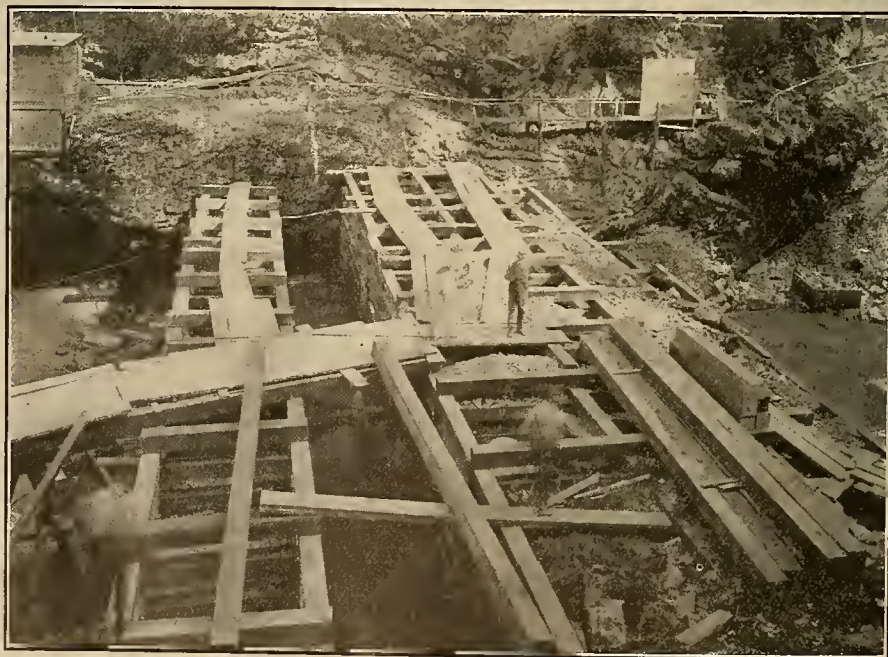


Fig. 2—Upper cofferdam showing the clay puddle chamber used as a water seal

The dam is located at the upper end of the Baker River canyon, which is a gorge of nearly vertical sides and over 300 ft. deep. The ridge through which the river has been cutting its way for ages is of limestone foundation with occasional strata of shale. The bed of the stream is of solid limestone and cut up more or less with pot holes and ridges, the harder strata of limestone resisting the erosion, of course, more than the softer rock. This effect results in a roughened condition of the stream bed, making possible an excellent bond with the masonry of the dam.

Bedrock was found over the entire bottom of the dam at an average depth of 35 ft. below the bed of the river. Before excavation for the dam could proceed it was necessary to drive a diversion tunnel 17 ft. by 24 ft. in cross-section from a point some 200 ft. above the upstream face of the dam to a point 300 ft. below the downstream face. The intake for the diversion tunnel was driven well below the bed of the stream, so that when the final shot was made in the rock wall separating the tunnel from the river bed, over two-thirds of the stream flow was diverted. A map is shown in Fig. 4.

As soon as the diversion tunnel was placed in use the work of constructing the upstream cofferdam was begun. This structure was built of 10x10-in. timbers laced together both longitudinally and transversely to the stream. The crib work was divided into two portions. A double crib on the downstream side and a single crib on the upstream side were filled with rock. The space in between these two sections was



Fig. 3—Downstream face of the Baker River dam as it appeared about May 1. The openings shown are for temporary use to pass the river flow when the temporary diversion tunnel is sealed off. They may be closed up when it becomes necessary to fill the reservoir

puddled with clay. The puddle chamber was lined first with 2-in. planking. This whole arrangement made a very tight dam that successfully withstood several floods and made possible the pouring of concrete in the upstream portion of the dam. This is shown in Fig. 2.

Some of the floods of around 25,000 sec.-ft. washed out sections of the crib after the concrete had well covered the bottom, making it necessary to reconstruct portions of the crib after the severest floods. One particularly heavy flood finally took out the whole crib, but this occurred at a time when it was necessary to replace it with only a low structure of simple design, the masonry in the dam then being almost up to the river level.

The downstream crib was never any more than a simple structure. At first a triple crib was constructed, the two outside ones being filled with rock, and

the inside one with a clay puddle. During the latter stages of construction a sack dam was all that was required to keep the backwater of the river from encroaching on the excavation.

Owing to the great depth of boulders in the stream bed, the leakage from the upstream cofferdam during the earlier stages of construction was considerable. The water was picked up from successive pools just inside the cofferdam, the leakage from each pool growing continuously smaller. The large pumps were of the 10-in. single-stage centrifugal type, direct-connected to 200-hp., 700-r.p.m., 2,300-volt a.c. motors. There never were more than three of these pumps in service at any one time.

In addition to the large pumps, there were a number of 8-in., 6-in. and 4-in. pumps, all direct-connected in such a way that they could be removed quickly in case of flood danger. Owing to the numerous fluctuations of the river it

was necessary to take out the pumps and piping completely a number of times before the concrete finally was placed up to the level of the upstream cofferdam.

The last winter season on the Baker River was extremely wet, rainfall in January, 1925, alone being 15 in. Other months from October, 1924, to February, 1925, had rainfall nearly as great. The construction forces therefore had only short periods of time between floods to excavate small portions of the river bed and to place concrete. The masonry reached the level of the upstream cofferdam, El. 201, on March 1, 1925. This entirely shut off the river flow and since that time the placing of concrete in the balance of the structure has been comparatively simple.

Three temporary openings 12 ft. by 20 ft. have been left in the dam to take care of the river flow after the diversion tunnel is closed. The closing of these openings will start the filling of the reservoir.

The construction plant is placed 350 ft. above the bed of the river so that all concrete is placed entirely by gravity. Two lines of chutes extend from the plant to the dam, the total chute capacity being 150 cu.yd. of concrete per hour. Three 1-yd. mixers supply concrete to the chutes.

Sand and gravel are taken from the river bed about one-half mile upstream from the dam and after washing and screening are hauled by an incline railroad to bunkers above the mixers. Cement likewise is taken from cars above the mixers and carried to the mixing platform by gravity on inclined belts. The mixing operations are controlled by telephone from the forms at the dam. Storage capacity of 750 cu.yd. handled by derricks is within 300 ft. of the bunkers. However, the gravel incline is in continuous operation.

A total of 60,000 cu.yd. of concrete had been placed in the dam up to May 30. This is about two-thirds of the entire structure. It is expected that the dam will be completed in ample time to catch the fall runoff of the river basin.

The work of design and construction of the dam, as well as the entire project of the Baker River development, is being carried out by the Division of Construction and Engineering of Stone & Webster, Inc.

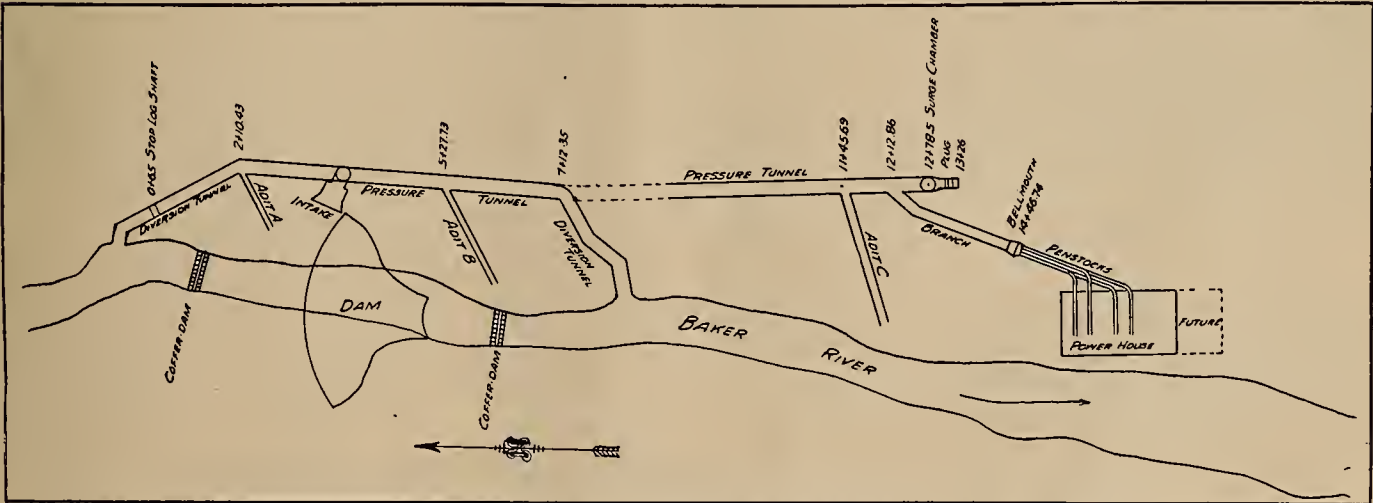


Fig. 4—Sketch map of the Baker River project of the Puget Sound Power & Light Company

Special Recording Meters Write Station Log

Operations of Automatic Railway Substations Accurately Plotted by Specially Constructed Meters

By E. W. COOK, Electrical Department, Pacific Electric Railway Company, Los Angeles

Automatic control for electrical machinery is being developed and applied wherever practical. One of the principal developments along this line in recent years is the control of rotating machines in railway substations and small hydro-electric stations.

A large percentage of city and inter-urban railway cars is equipped with motors that operate on between 500 and 1,200 volts d.c. As it is not economical to transmit the amounts of power required at these voltages, it has become general practice to use a.c. transmission

operation counters or other recording devices on some of the more important relays, and other similar arrangements. The Pacific Electric Railway Company has ten automatic substations in operation and five more under construction and scheduled to be completed during 1925. These substations are scattered over a large territory. Some of them are nearly twenty miles, in different directions, from the load dispatcher's office. Private telephone lines connect all substations, but these lines already are loaded to the limit of satisfactory operation and could not be used for a remotely controlled indicator system. Several of the substations, however, have indicators controlled over the telephone lines to the nearest manual substation to notify the attendant whether the automatic is "on" or "off". Special graphic meters, one in each substation, are used to record the d.c. load, the trolley feeder voltage and the operation of four of the automatic-control relays.

Several standard type graphic meters might have been used, each to record a given function. However, it is very desirable to have all records on one chart for convenience of inspection and for filing for future reference. The use of one chart has the further advantage of removing doubt as to the sequence of events, which might be uncertain or difficult to determine if recorded on separate charts.

Referring to the wiring diagram shown in Fig. 2 it may be seen that No. 1 pen is controlled by relays Nos. 4 and 12. No. 4 deflects the pen to the left and No. 12 to the right. If the control functions normally during the starting cycle, No. 1 pen is deflected to the left for a short time (approximately 50 seconds) and a few seconds after it is released from the left it is deflected to the right where it remains until the machine is shut down. Any other record by No. 1 pen indicates abnormal starting conditions or unreliable operation of some part of the control.

Pen No. 2 is deflected to the left by the opening of the overload contactor and to the right when the time-delay, underload relay is energized.

Overload protection is obtained by inserting resistance in the trolley-feeder or main-bus circuit, and if used when not needed an unnecessary energy loss is sustained. A record of the use of this resistance is kept by No. 2 pen. Idling of the machine on light load is indicated by the d.c. ampere record and

any abnormal operation of the shut-down relays also is shown by No. 2 pen.

Outlining in detail the operation of the different recording pens, the following may be of interest (see Fig. 4):

Coil No. 6 is energized when the overload grids are cut into service by relay "GM15". An auxiliary contact on the contactor energizes the pen coil. This records overloads even though the machine may not be tripped off.

Coil No. 5 is energized when the underload relay "GM 13" shuts the machines down.

Coil No. 4, voltmeter coil, is cut in series with the reverse polarity relay "32". This saves the use of extra resistance for 1,200-volt service, but records the failure of the relay magnetizing coil.

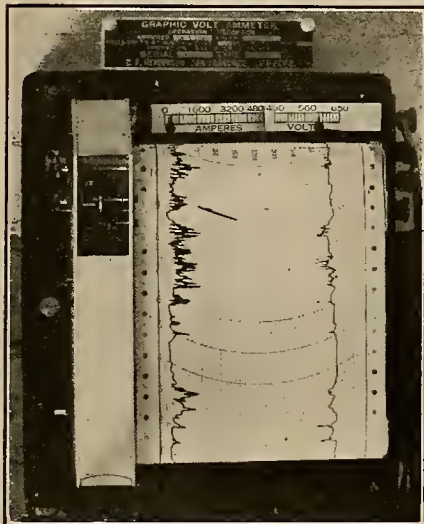


Fig. 1—Graphic recording meter at Vineland automatic substation of the Pacific Electric Railway Company near Los Angeles. This meter shows a permanent record covering ampere load on the station, voltage at the station d.c. bus, whether the machines were tripped off the line due to overload or due to underload, the actuation of the starting mechanisms, and the times at which the changes occurred

at high voltage and convert it to direct current in substations located at suitable points near the load. Previous to the development of automatic control the rotating machinery in these substations was operated manually. Elaborate records were made of the loads and other details of operation in order to make the best use of the equipment available.

With the change to automatic control it was only natural to attempt to obtain similar information of the automatic control by the use of graphic meters, remotely controlled indicators located in the load dispatcher's office,

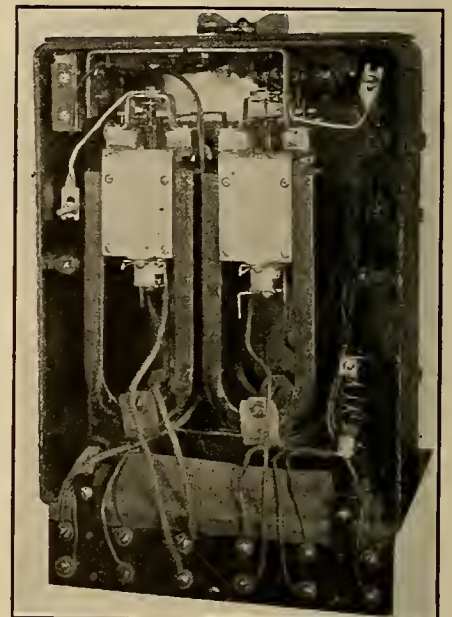


Fig. 3—Rear view of graphic recording meter showing the operating mechanisms. The two large elements are the ammeter and the voltmeter elements. Above each of these elements is another little mechanism, one controlling the starting-record pen and the other controlling the stopping-record pen

Coil No. 3 is connected in the indicating ammeter lead to avoid the use of an extra shunt.

Coil No. 2 is energized through an auxiliary contact on running contactor "37", the main-line d.c. circuit breaker.

Coil No. 1 is energized through an auxiliary contact on starting contactor "6".

The straight-line record appearing at either side of the chart on the meter shown in Fig. 1 shows normal continuous operation of the machines. The left-hand record line would be about $\frac{1}{4}$ in. farther to the left if the machines

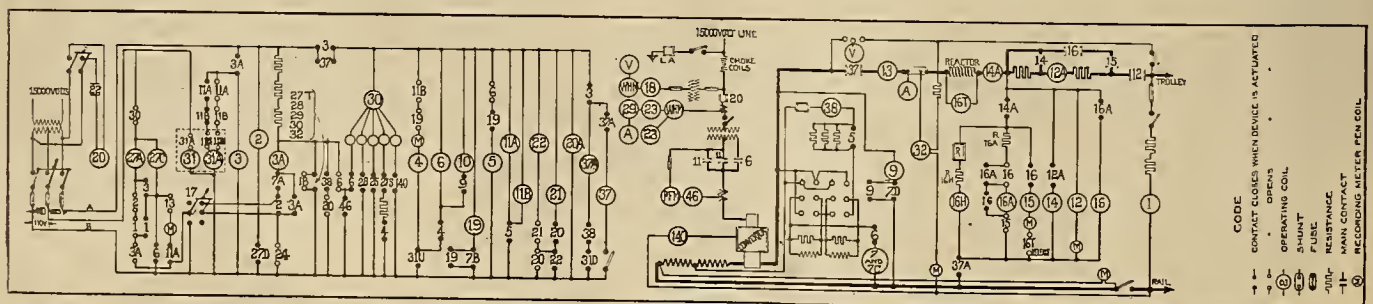


Fig. 2.—Schematic wiring diagram for automatic railway substation showing where recording meter coils are connected into control circuits.

were off the line, and about $\frac{1}{2}$ in. farther to the left than shown during the starting periods. The straight-line record at the right of the same chart would be about $\frac{1}{4}$ in. farther to the right during a period of overload and $\frac{1}{4}$ in. farther to the left than shown if the machines were tripped off the line due to underload.

Proper interpretation of these charts is not difficult for anyone familiar with the operation of the automatic control and with the records made by the meter.

Several more pens could be used to record the operation of other parts of the control, but the mounting of two

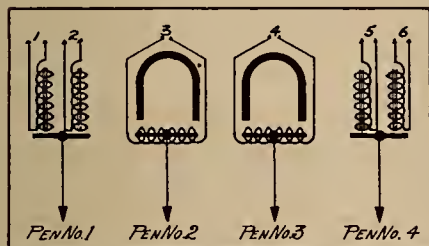


Fig. 4—Schematic sketch showing the different operating mechanisms of the four pens in the recording meter

standard graphic-meter elements and two additional pens, each controlled by two electromagnets, in one standard case is a radical departure from standard instrument design and any additional pens could be had only at considerable increase in the cost of the meters.

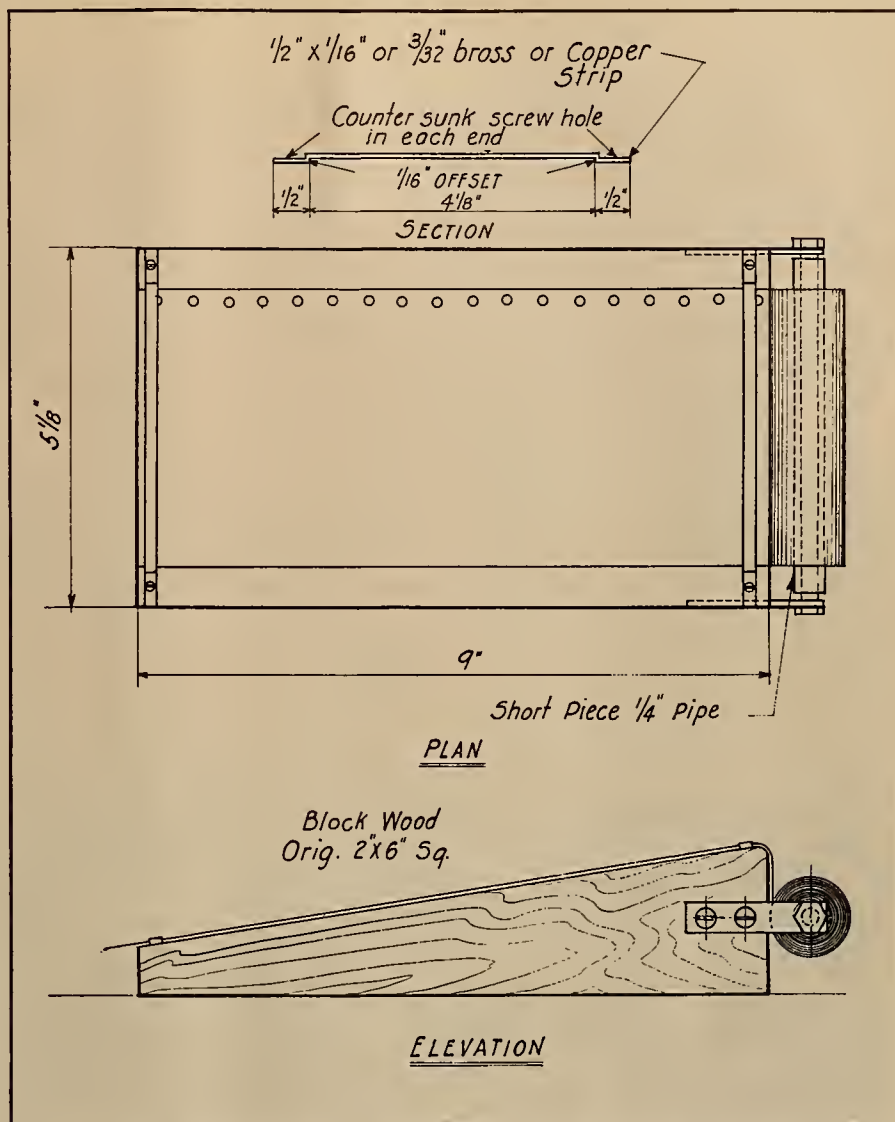
These charts give all of the essential information required for adjusting the operation of equipment and are a suitable substitute for the records taken by the attendants in manually controlled substations.

Scratch Pad Made of Wood Block and Meter Record Roll

A handy block for converting old graphic-meter record rolls into a readily accessible scratch pad is shown in the accompanying illustration. This is a simple device, easily made, and one which is well worth the small effort necessary for its construction. Any scrap piece of 2x6-in. planking will lend itself admirably to the job. A piece of fairly hard, close-grained wood is preferable, however.

As illustrated, the block is tapered from a thickness of about 2 in. to about $\frac{3}{4}$ in. to provide a sloping writing surface. The two strips which serve as paper guides are shaped most easily from a scrap piece of control-board bus bar about $\frac{3}{16}$ in. thick and perhaps $\frac{1}{2}$ in. wide. The supports for the roller can be fashioned easily from most any piece of waste copper that may be available. A $\frac{1}{4}$ -in. bolt upon which to thread the record roll will complete the equipment, unless it should be desired to add a piece of small pipe or metal tubing over the bolt to make the roll ride more easily. If the block be carefully finished and the copper kept polished the pad will prove to be ornamental as well as useful.

Scratch paper is generally scarce around a power house or substation. At the same time in most plants there is at least one recording meter using a roll record, and many times there are several of these instruments in service. In



Handy scratch pad for the station desk utilizes old meter record roll

most cases these rolls are not used for permanent record purposes. Sometimes they are run through the meter two or more times as an effort toward economy.

However, to use these rolls for scratch paper after their usefulness for record purposes is over, is as effective a measure of economy along this line as any.

Electricity Ventilates Stampede Tunnel in Cascades

An unique application of electricity to railroad operations recently was made by the Puget Sound Power & Light Company, Seattle, when it installed electric service to drive the ventilating fans in the famous Stampede tunnel of the Northern Pacific company in the Cascade Mountains, replacing an antiquated steam drive. The tunnel is 9,800 ft. long, and nineteen trains pass through it daily so that the need for forced ventilation is apparent. Two large fans, each driven by a 500-hp. motor, are located at the western portal to blow the air eastward through the tunnel. The motors are controlled manually, and it is the practice to start the fans for west-bound trains when the train enters the eastern portal, and for east-bound trains when the train leaves the eastern portal. The fans are left

running until the interior has been cleared of smoke and gases.

Service for the motors is supplied from 110,000-volt transmission line of the Puget Sound company running from Seattle to Wenatchee, which passes near the Northern Pacific right-of-way at this point. A 1,500-kw. substation was installed to carry the service.

N.E.L.A. Issues Two Serial Reports.—"Radio Interference," serial report of the inductive co-ordination committee (1924-1925), and "A.C. Substation Design Practice," serial report of the electrical apparatus committee (1924-1925), Technical National Section, have been published by the National Electric Light Association. Copies may be obtained upon application to the association at 29 West 39th Street, New York City.

Power Switchboard and Switching Equipment Handbook Published.—The Electric Power Club of Cleveland recently has issued a "Power Switchboard and Switching Equipment Handbook." The book is divided into four parts: instructions for installation, operation and care; definitions, abbreviations and symbols; adopted standards and practices; and safety standards.

IDEAS FOR THE CONTRACTOR

Pan Gas Has Largest Roof Sign in the West Immense Sign Erected in Los Angeles for Pan American Petroleum Company Has Many Unique Features

Five thousand two hundred and seventy-seven lamps to illuminate twelve letters is the record set by the "Pan Gas" sign on the roof of the Pan American Petroleum Building at Tenth and Flower Streets in Los Angeles. This is the largest roof sign in Los Angeles, the structure being 50 ft. high and 168 ft. long. Each letter is 28 ft. in height and the sign reads, "PAN GAS" double faced.

It was necessary to build a heavy steel structure to support this immense sign. Some idea of its size may be

obtained when one considers the sign structure is one-third of the height of the building, which is 150 ft. high, the building height limit in Los Angeles. This structure may be seen in the accompanying pictures taken on the roof of the Pan American Petroleum Building. The letters are probably the largest erected anywhere in America, and the sign may be read from very great distances.

The illumination of the sign is unique. The letters are of channel type illuminated by five rows of lamps. The cen-

ter row is red, the rows on either side are white and the outside rows green. The sign flashes first red, then green, then white, then all colors together. The illumination is with 10-watt sign lamps, the colors being secured by the use of Reco color hoods.

The design of the sign carries out the ideas of E. L. Doheny, chairman of the board of directors of the Pan American Petroleum Company, and is the largest electrical advertisement of any petroleum company in the United States. The work was executed by the Electrical Products Corporation of Los Angeles, who are specialists in manufacturing all types of electric signs and accessories. This installation is one of the largest ever made by the firm.



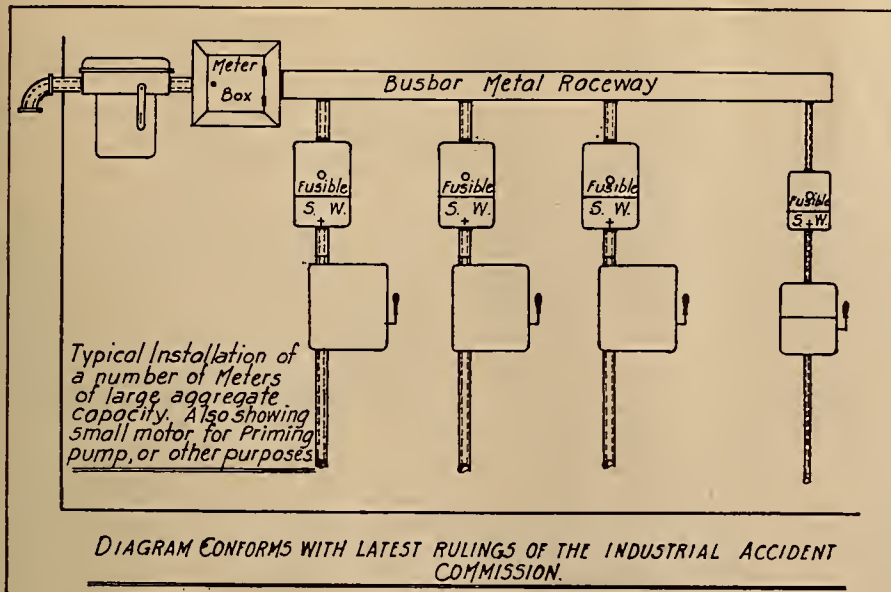


Fig. 4

Safety-First Installations for the Electrical Contractor

The Aug. 15 issue of the Journal of Electricity (p. 140) contained a discussion of a typical installation of two or more motors of moderate aggregate capacities. This was the third of a series of five which will show five different types of installations commonly made by electrical contractors.

Fig. 4 is a typical installation of a number of motors where the capacity may vary, showing large and small, but all within sight of an operator. It will be noticed that the service is brought directly to a circuit breaker just ahead of the meter box and then to a bus bar metal raceway where each circuit is led off to the disconnecting switches which are directly ahead of the starting equipment.

About the only differences between Fig. 3 and Fig. 4 are the circuit breaker and the metal raceway. The reason that a circuit breaker is shown here is that in many installations the circuit breaker is made necessary on account of the large capacity required by so many motors on the same service.

The bus bar metal raceway as shown in Fig. 4 is very simple, inexpensive, and as safe a method of bringing out a

bus for the circuit as can be devised. This metal raceway is usually 6 or 8 in. wide, 6 in. deep, and the length of the wall mounting that is desired. On the front is a cover that is installed by screws which enter the lip of the can and in this way covers up all of the unsightly wiring and connections that are made within.

It must be remembered also that if these circuits are led to motors where the switching apparatus installed is not in sight of the operator the non-fusible disconnecting switch must be installed.

Selling to the Meanest Man

A resourceful young salesman tried to sell an electrical washing machine to the meanest man in the world. His sales argument was that it would save the housewife.

"My wife's able-bodied and can stand lots of work," the sales prospect retorted. "That's why I married her—because she is a good worker."

"Then for goodness' sake," suggested the smart salesman, "why don't you give her the tools to make it possible for her to accomplish still more work for you?"—Nation's Business.

Electrical Community Kitchen a Feature of Modern Auto Camp

The Paso Robles auto camp presents a striking contrast to the average camp of this kind, especially with reference to the facilities provided in the community kitchen. Instead of the usual dark and dismal appearance produced by sooty stoves, this kitchen is light and airy after a full season's campers have made use of it. The reason for this is the fact that electric hot plates are provided for the convenience of campers.

These are placed in two rows in the center of the community kitchen. There are twenty Universal units of two plates each. The disconnecting switch for each unit is concealed in a locked compartment above each one. The table is lined with galvanized iron, which adds to its cleanliness and appearance. Compartments for the storage of cooking utensils are provided below the cooking units. A Hot-Point electric water heater provides continuous hot water service for the convenience of the guests.

C. T. Azbell, owner of the camp, is well pleased with the success of the electric kitchen and contemplates erecting a duplicate of the original installation to accommodate the increased demand of motorists. J. B. Hurst of Atascadero was instrumental in selling Mr. Azbell the idea of complete electrification and made the installation for him. A similar installation is now being made in an auto camp at Atascadero.

Automobile camps are installed in all parts of the country and more are being built all the time. All of these are potential prospects for this type of equipment, and offer a splendid field of development by the progressive contractor.

Booths have been built around the walls in the kitchen for the convenience of guests in serving their meals. Tables are provided as well as built-in benches. Thus a family stopping at this auto camp is not only able to cook its meals in a clean and cool kitchen but also has the facilities for serving the meal without being annoyed by the dust and dirt produced by passing automobiles and other campers.

The use of the community kitchen, together with the use of the electric hot plates, hot water, and other conveniences, is included in the nominal charge for stopping at the camp.



Left: Exterior of the electric community kitchen in Paso Robles auto camp of C. T. Azbell. Right: Interior view showing the electric hot plates which are provided for guests at the camp. The sink in the background is provided with hot and cold water, the water being heated electrically

Electrical Estimating for the Contractor — III

An Electrical Layout is Made for a Typical Small-Power Installation in This Article, the Third of a Series

By J. R. WILSON*, Engineering Department, Los Angeles Electric Works

To apply the rules contained in the previous installment of this article, let us take a typical small-power installation and make an electrical layout for it.

Referring to Fig. 1, which shows the location of machinery and motors, we observe several important items which bear on the electrical wiring scheme.

along the "alley" wall, because it will not interfere with future building operations. Upon inspection we find that the largest motors (15 and 20) are close together. Upon consulting the owner we find that the wall space between these motors can be spared for the metering equipment.

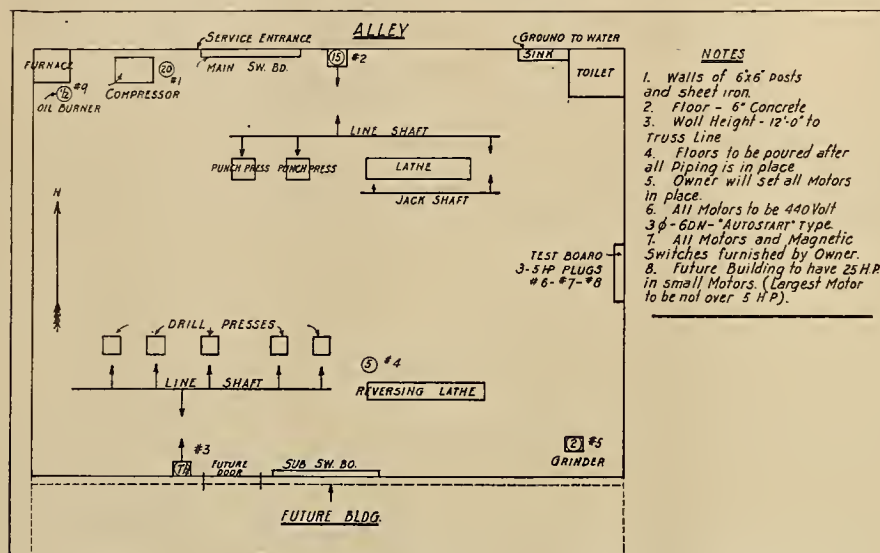


Fig. 1.

We summarize these items as follows:

1. Building sets on alley line.
2. Water (at sink) is on alley side of building.
3. Largest motors are on alley side of building.
4. Floor is to be of concrete.
5. All motors are of "auto start" type.
6. All motors are 440-volt, 3-phase, 60-cycle.
7. Future building to have 25 hp. in small motors.
8. Furnace to be fed by "oil burner" set.

With this data to work with we can proceed to analyze the job. Items 1, 2 and 3 show that the logical place to locate the service entrance and meter is

Upon further inspection we find that the balance of the motors are located adjacent to the south wall, also the future 25-hp. is on that side. We decide that it will make the best installation if we locate a sub-switchboard on this wall, and the owner assigns a location for it.

Checking the motors shown on the plan and consulting table No. 1, we get the following data from which to figure our feeder loads:

Compressor	20 hp.=65-amp. starting current
Line shaft	15 hp.=19-amp. running current

TABLE NO. 1
3-Phase—440-Volt Squirrel Cage Induction Motors

Rated hp.	Approx. full load current	To running overload protection rubber or varnished cloth insulation wire	Rubber insulation wire	Varnish cloth insulation wire	Circuit overload protection	Motor running overload protection
1/4	.5	14	.....	.....	5	.....
1/2	1.0	14	.....	.....	5	.....
3/4	1.3	14	.....	.....	8	.....
1	1.6	14	.....	.....	10	.....
1 1/2	2.3	14	.....	.....	12	.....
2	3.0	14	.....	.....	15	.....
3	4.6	14	.....	.....	20	.....
5	7.7	14	.....	.....	25	.....
7 1/2	10	12	.....	.....	30	.....
10	13	10	.....	.....	35	.....
15	19	8	.....	.....	50	.....
20	26	6	.....	.....	65	.....
25	32	6	.....	.....	75	.....
30	38	6	.....	.....	90	.....
35	44	4	.....	.....	100	.....
40	51	4	.....	.....	120	.....
50	62	3	.....	.....	130	.....
60	73	1	.....	.....	150	.....
75	91	0	.....	.....	200	.....
100	123	000	.....	.....	250	.....
125	156	0000	.....	.....	325	.....
150	184	250 M	.....	.....	375	.....
200	246	350	.....	.....	500	.....
250	310	500	.....	.....	600	.....

NOTE—Wire sizes and conduits given do not apply for motors for elevators and cranes.

* All rights reserved by the author.

Lathe	5 hp.=7-amp.	"	"
Test plug No. 1	5 hp.=7-amp.	"	"
Test plug No. 2	5 hp.=7-amp.	"	"
Test plug No. 3	5 hp.=7-amp.	"	"
Grinder	2 hp.=3-amp.	"	"
Line shaft	7 1/2 hp.=10-amp.	"	"
Oil burner	1/2 hp.=1-amp.	"	"
Future (1 1/4 amp. per hp.)	25 hp.=32-amp.	"	"
Extra	33 hp.=42-amp.	"	"

Total 200 amp. service switch

By consulting column B of table No. 2 we see that No. 1 wire has a capacity of 150-amp. while 1/0 has capacity of 200-amp., so we take the 1/0 wire as the size for our service wire. This automatically gives the owner an added capacity of 33 hp. at no additional cost.

Upon further inspection of the plan,

TABLE NO. 2
Safe Carrying Capacity of Copper Wires

Size B&S	Circ. Mils.	"A" Rubber	"B" Other Ins.	"C" Var. Cloth	"D" 15 Min.
18	1624	3	5	.....	.....
16	2583	6	10	.....	.....
14	4107	15	20	18	22
12	6530	20	25	25	26
10	10380	25	30	30	33
8	16510	35	50	40	50
6	26250	50	70	60	73
4	41740	70	90	85	97
2	66370	90	125	110	130
1	83690	100	150	120	154
0	105500	125	200	150	182
00	133100	150	225	180	220
000	167800	175	275	210	270
0000	211600	225	325	270	325
250000		250	350	300	375
300000		275	400	330	435
350000		300	450	360	500
400000		325	500	390	555
500000		400	600	480	660
600000		450	680	540	750
700000		500	760	600	830
800000		550	840	660	905
900000		600	920	720	975
1000000		650	1000	780	1040
1100000		690	1080	830	.....
1200000		730	1150	880	.....
1300000		770	1220	920	.....
1400000		810	1290	970	.....
1500000		850	1360	1020	.....
1600000		890	1430	1070	.....
1700000		930	1490	1120	.....
1800000		979	1550	1160	.....
1900000		1010	1610	1210	.....
2000000		1050	1670	1260	.....

we find that all the motors (except the 15-hp., the 20-hp. and the 1/2-hp.), will go to the sub-switchboard. We also see that the largest individual motor in this group is the 7 1/2-hp.

So now we will check on Table No. 1 to determine the size of our sub-feeder:

Line shaft	7 1/2 hp.=30-amp. starting current
Lathe	5 hp.=7-amp. running current
Test plug No. 1	5 hp.=7-amp.
Test plug No. 2	5 hp.=7-amp.
Test plug No. 3	5 hp.=7-amp.
Grinder	2 hp.=3-amp.
Future	25 hp.=32-amp.
Add to fill switch capacity	5 hp.=7-amp.

Total 100-amp. sub-feeder switch

Column B, table No. 2, gives us No. 2 wire as being correct for this feeder.

Our service conduit will be run exposed, using one elbow to carry to the outside of alley wall. As the concrete floor will be poured after all other work is completed, we will take advantage of this fact and run all conduits in the floor as far as practicable. On this basis we will use two elbows on our sub-feeder conduit.

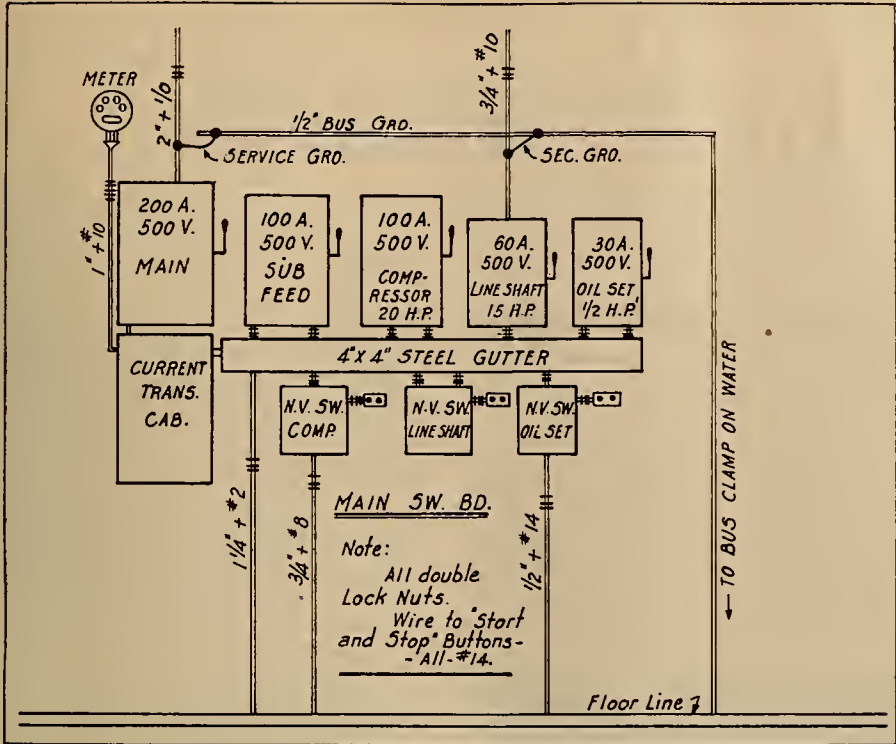


Fig. 2.

By checking on table No. 3 we see that our service conduit will be of 2-in. size, and our sub-feeder conduit will be of 1 1/4-in. size. In this job layout no attention will be paid to distances, or "drop" as at this time we are interested only in analyzing the job. In the ordinary small job, such as this, the wire sizes listed in the accompanying tables usually will be ample to take care of the drop, especially on 220 and 440-volt installations.

We will locate all the magnetic switches, except those for the test plugs, on the switchboards. Referring again to Fig. No. 1, and also to table No. 1, we get the following data for the individual motor wiring:

- 20 hp.—3 No. 6 wires to N. V. switch and 3 No. 8 to motor.
- 16 hp.—3 No. 8 wires to N. V. switch and 3 No. 10 to motor.
- 7 1/2 hp.—3 No. 12 wires to N. V. switch and 3 No. 14 to motor.
- 6 hp.—3 No. 14 wires to N. V. switch and 3 No. 14 to motor.
- 2 hp.—3 No. 14 wires to motor.
- 1/2 hp.—3 No. 14 wires to N. V. switch and 3 No. 14 to motor.

You will note that a magnetic switch is specified on the 1/2-hp. motor, and not

		TABLE NO. 3									
		Number of Wires									
		In Conduit with 290 deg. Full Radius Ells									
		(Based on 40% space factor)									
B & S		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
14		4	6	9	.....	.....	.....	.....	.....	.....	.....
12		4	5	9	.....	.....	.....	.....	.....	.....	.....
10		2	4	7	9	.....	.....	.....	.....	.....	.....
8		.....	3	5	9	.....	.....	.....	.....	.....	.....
6		.....	.....	3	4	6	9	.....	.....	.....	.....
4		.....	.....	.....	3	4	8	9	.....	.....	.....
2		.....	.....	.....	3	4	6	9	.....	.....	.....
1		.....	.....	.....	2	3	5	7	9	.....	.....
0		.....	.....	.....	.....	2	4	6	9	.....	.....
00		.....	.....	.....	.....	3	5	8	9	.....	.....
000		.....	.....	.....	.....	3	4	7	9	.....	.....
0000		.....	.....	.....	.....	2	3	6	8	9	.....

on the 2-hp. motor. This is explained by the fact that the 1/2-hp. motor is located on an "oil burner" set. If the voltage fails (and the fire is extinguished) and then suddenly returns to the line, the set would automatically feed oil against the hot boiler, and might cause a disastrous explosion. On the other hand the 2-hp. motor is on a grinder, which is not considered a "dangerous machine", and ordinarily would cause no damage by being suddenly thrown on the line.

Referring to Fig. No. 2, we have the set-up of the main switchboard.
(To be continued.)

Survey Points Out Large Field in Store Window Lighting

A recent survey throughout the country shows that out of the 2,000,000 stores now doing business in the United States only one store in twenty has illumination that may be considered good, while only one store in thirty-five has window-illumination intensity of fifteen foot-candles.

An entirely independent survey recently was conducted in the field of economics to determine the number of merchants who start in business and succeed and the number who start and fail. This survey proved that out of every twenty men who inaugurate business enterprises nineteen fail and one succeeds.

These entirely different surveys found that ninety-five per cent of the business places in the country are poorly lighted, also that ninety-five per cent of the business enterprises launched in the country fail. It is interesting to note that the percentage of failures is identical with the percentage of defective lighting installations.

It is not intended to infer that a properly lighted store is a sure means of success, but better lighting is an aid to a successful business, and contractors can prove this fact.

"Welcome Electragists" Sign Prominent at Eureka

The electragists of Eureka were very active in doing everything possible to make visiting delegates feel welcome during their stay in that city while attending the recent convention of California Electragists. All stores of electragists displayed in a conspicuous place a painted sign, "Welcome Electragists," some dealers putting these signs in their windows and others on stands at the entrance of the stores.

One electragist also had "Welcome Electragists" printed into his electric sign. These signs and cards of welcome made a very favorable impression on the delegates to the convention and also did a great deal of good in getting the word "electragist" before the people of Eureka.

The newspapers cooperated with the convention exceptionally well and gave a great deal of space in their news columns to its proceedings. They, too, made frequent reference to electragists in all stories. Publicity of this kind will do much to educate the public to the true meaning of the word "electragist."



Left: The electric sign of the Janssen Electric Company during the convention of California Electragists recently held in Eureka. Right—front of the Eureka Electric Company showing in a prominent place the sign of welcome to electragists. These signs were used by all electragists

BETTER MERCHANDISING

Are You All Through? Sold to the Highest Bidder!

Southern Colorado Power Company Uses Auction to Gain List of Prospects in Electric Washer Campaign

Sealed bids for the purchase of an electric washing machine constituted one of the unique features of a sales campaign recently conducted by the Southern Colorado Power Company. Judging from the interest displayed in the auction of the washer, the idea was considered by the company as entirely satisfactory. The campaign lasted one month and during that time 408 electric washing machines were sold.

The plan as outlined and put into effect by the Colorado company consisted in the announcing of the auction of an electric washer, the washer to go to the person making the highest bid. Newspaper announcements as well as window displays called the public's attention to the auction. All bids were to be made on cards specially prepared for the auction and distributed from the company's districts offices. Bids were to be received on one day only, the auction being held after the sales campaign had been under way about two weeks.

The campaign was conducted simultaneously throughout the entire territory served by the company. Offices are maintained in Pueblo, Canon City, Cripple Creek, Victor, La Junta, Rocky Ford and Ordway. The auction was held on the same day in each of the districts. The highest bids for the washers ranged from \$95 to \$123.75. The sale price of the machines was \$125.

As each bid that was submitted was signed by the bidder, the names of the unsuccessful bidders made an excellent list for salesmen to visit. A suitable list was prepared from the bids and was given to the salesmen in each district. Armed with this list of prospects the salesmen made a house-to-house canvass of the seven cities, and each salesman exceeded his quota set before the campaign was opened.

Plans for the washing-machine campaign were made by the utility company working with representatives of the Automatic Washing Machine Company. Twelve salesmen were employed to conduct the personal solicitation provided for in the plans. In addition to this the regular employees of the company were given a bonus for turning in prospects and for making direct sales. Quotas were prepared for each branch office and for each salesman. The total quota for the entire property was 200 machines. Due to the well laid plans and advertising used, the salesmen were able to place a total of 408 new washers in the homes of people taking service from the central station. Each branch sales office sold double its quota, no particular office overselling the others.

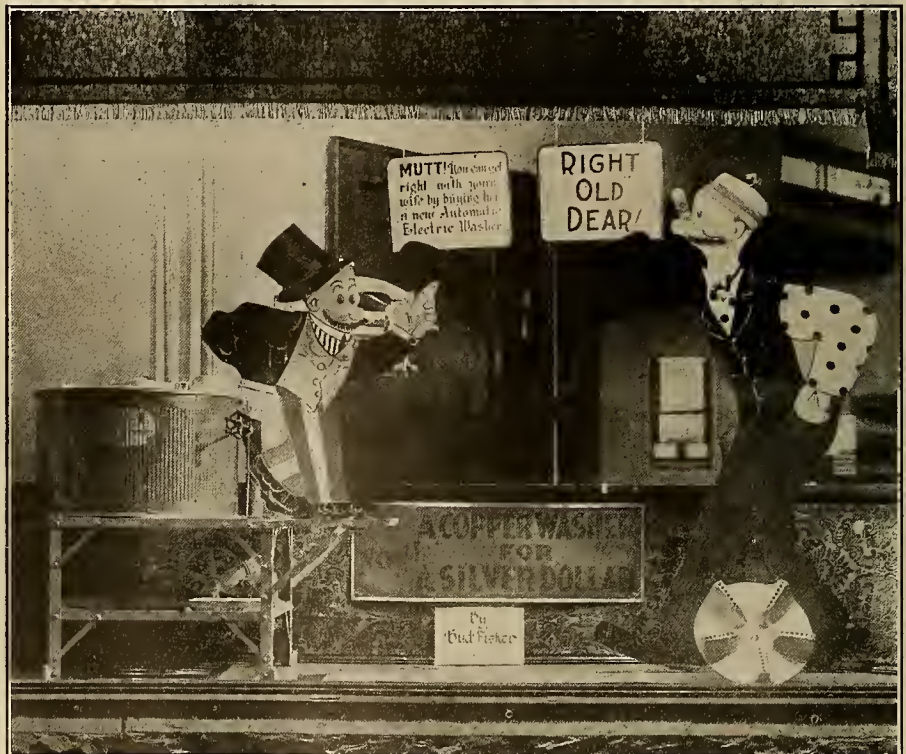
The success of the campaign is verified by the fact that in seven cities with a population of 61,599 sales of new washing machines totaled 408 within a period of one month. These cities are located in five Colorado counties, which in January, 1923, had a total of 15,930 residential lighting customers. The total retail value of the merchandise sold during the campaign was \$51,000 or an average of approximately \$3.20 per residential lighting customer.

Previous to the opening of the campaign all of the outside salesmen and the local salesmen were called into the general offices of the company in Pueblo and were given the details of the sales campaign that had been planned. In this way each salesman was acquainted with the entire sales plan as outlined by the executives of the company. At this meeting it was decided to start the campaign with a gift day, the purpose of this scheme being to draw possible prospects into the company's district offices on the first day of the sales drive. Each lady that came into one of the company's offices was given a rubber apron. As the apron was passed out the lady's name was taken and was added to the list of prospects.

Plans for the campaign also included the giving of rubber aprons and electric percolators as special premiums. The company conducted a similar campaign last year, and it was decided to use approximately the same slogan—"Now a Copper Washer for a Silver Dollar"—as this had been well received by the public. The slogan was used in all of the advertising, and skull caps, which were passed out to the children, were decorated with the device. The slogan was originally adopted on account of the down payment of \$1 that was accepted. The balance of the purchase price was to be paid in monthly installments of \$5 each.

In a similar campaign conducted a year ago the Southern Colorado Power Company sold in the neighborhood of two hundred machines. The quota for this year's drive was based on the sales recorded in the previous campaign. Though the sales were doubled in the last campaign the relation of the number sold in each district remained nearly constant.

Fred E. Staible, Inc., recently organized by Fred E. Staible, Jr., formerly head of the Wesco Supply Company, Denver, will represent the following manufacturers: United States Rubber Company, Illinois Electric Porcelain Company, Enamelled Metals Company, Triangle Conduit Company, and Steel City Electric Company.



One of the window displays used to attract attention to the washing-machine campaign conducted by the Southern Colorado Power Company in all of its districts.

Campaign Sells 2,000 Electric Fireless Cookers

Valley Electrical Supply Company Proves Demand Exists for Practical Moderate-Priced Appliance

By J. U. BERRY

Advertising Manager, Valley Electrical Supply Company, Fresno, Calif.

On the theory that there was a demand for a portable, practical, easily cleaned, moderate-priced electric fireless cooker, the Valley Electrical Supply Company of Fresno, Calif., recently staged a selling campaign featuring this appliance. Results more than justified the theory, for over 300 cookers were sold on the first day of the campaign, by the end of the first week orders had been taken for more than 700, and at the close of the sale 2,000 electric fireless cookers had been sold.

It was decided that the opportune time to start a cooker campaign in the San Joaquin Valley was just after the close of school at a time when vacation trips were being planned, because such a cooker would have a strong appeal to those who were going to the seashore or mountain resort where electricity was available. Also, the warm weather starts about the middle of June, which presented another strong selling argument in favor of the electric cooker.

After deciding on the time and selecting the cooker to be featured, the next big problem was how to get the story over to the housewife. The message must be told completely and clearly in the advertising, because the cooker had no proven worth to the housewife. It was something new to her and brought to her at a price that might make her sceptical of its quality and value, therefore she must take it on the recommendation of the seller.

A four-column advertisement was prepared and carefully revised several times. This advertisement appeared in both Sunday newspapers on June 14, and the sale started on Monday, June 15. Three days prior to the start of the sale the following letter was mailed to 700 customers who had purchased electric percolators in a recent percolator campaign:

Dear Madam:

When you purchased that Electric Percolator during our recent Annual Percolator Sale, you proved to us that you know a good value and that you are seeking "Things Electrical" because they are practical and will lighten your household duties.

AND NOW!

We just want to tell you about another wonderful value—it's an **ELECTRIC-FIRELESS COOKER** that will cook any kind of food, any way you want it cooked. No housewife who gives proper consideration to her time and energy will be without it. It is a real time and labor saver that will cook foods more tastily and delicious. Just the sort of **HIGH QUALITY Electrical Device** that will appeal to you. And think of it! The price is only \$7.95 On Terms of \$1.95 Down and the balance in three equal payments of \$2.00 each.

This Sale Starts Monday, June 15th, but you will be allowed the privilege of purchasing your Cooker on Saturday, June 13th if you present this letter—thus, we will have more time to demonstrate the Cooker to you.

Read the enclosed circular and it will tell you what the **COOKER** will do. We know you will want to tell all your friends about it. You'll be enthusiastic, too. It's the best Cooker Value obtainable.

As a result of these letters 105 cookers were sold on Saturday. A broadside, which was an exact duplicate of the initial advertisement, was run off on good quality book paper and deliv-

ered to every home in the city two days before the sale. The response from this and the newspaper advertising was far beyond expectations. Over 300 cookers were sold on Monday, the first day. The company's original order called for 500 cookers, but by the end of the first week orders had been taken for more than 700 cookers without any further advertising.

On Sunday, June 21, another advertisement was run in both papers stating that 500 more cookers had been ordered and that delivery would be made before the middle of July. In this advertisement an apology was made regarding inability to deliver cookers as ordered. The response was phenomenal, and at the close of the sale 2,000 cookers had been sold.

a strong appeal; the fact that the meal could be started in the cooker and the cooker placed in the automobile and taken to the hills where the picnic lunch could be served piping hot and deliciously cooked made the appeal doubly attractive.

The company's obligation to the hundreds who have purchased these cookers does not end when the cooker is delivered into the home; it must see that the customers are satisfied with what the cooker will do. It is the company's duty to its customers, to itself and to the power company to see that the cooker is kept in use. Therefore, a special set of recipes, all of which will be tried and proved, is being prepared. These will be sent to each purchaser of a cooker and will be accompanied by a letter which will convince the customers that the company still is interested in them and are ready at all times to be of service. The success of future campaigns depends upon keeping the purchasers satisfied with the article and convincing them that it is to their advantage to continue its use.



Electric cooker window of Valley Electric Supply Company in San Joaquin Bldg. during campaign.

One of the most important selling factors in this electric cooker campaign was a demonstration booth just inside the main entrance of the building. On display here were cakes, pies, meat roasts, vegetables, baked beans, rice, baked apples and stewed prunes, all of which had been cooked in the cooker. One cooker was kept in operation during the entire first week, sending out delicious odors of roast meat and vegetables. Ice cream and ices which had been frozen in the cooker were also on display.

During the first days of the sale as many as twenty-five to thirty women were gathered around the demonstration booth at one time, all eager to learn about the cooker. Most of these women knew the advantages of the fireless cooker, but were not familiar with the added conveniences of the electric fireless cooker. This cooker campaign, coming as it did just at the start of the hot weather, presented a wonderful opportunity for the housewife to spend more of her time out of the hot kitchen and still have more appetizing meals to set before the family. The portable feature of this cooker also had

DO YOU KNOW?

That 21,000,000 letters went to the Dead Letter Office last year?

That 803,000 parcels did likewise?

That 100,000 letters go into the mail yearly in perfectly blank envelopes?

That \$55,000 in cash is removed annually from misdirected envelopes?

That \$12,000 in postage stamps is found in similar fashion?

That Uncle Sam collects \$92,000 a year in postage for the return of mail sent to the Dead Letter Office?

That it costs Uncle Sam \$1,740,000 yearly to look up addresses on misdirected mail?

That 200,000,000 letters are given this service, and—

That it costs in one city alone \$500 daily?

That this vast sum could be saved and the Dead Letter Office abolished if each piece of mail carried a return address, and if each parcel were wrapped in stout paper and tied with strong cord?

Moral: Every man knows his own address if not that of his correspondent. Put it in the upper lefthand corner!

NEWS OF THE INDUSTRY

Hetch Hetchy Contract Opinion Refused by Secretary Work

Hubert Work, Secretary of the Interior, has declined to render an opinion upon the validity of the contract made between the city of San Francisco and the Pacific Gas and Electric Company for the distribution of power from the Moccasin plant of the Hetch Hetchy project. In a letter written to James Rolph, Jr., mayor of San Francisco, he stated:

The act approved December 19, 1923 (38 Statute 242), does not require the Secretary of the Interior to approve or disapprove contracts such as the contract entered into between the City and County of San Francisco and the Pacific Gas and Electric Company, dated July 1, 1925.

It is the duty of the City and County of San Francisco at all times to comply with and observe on its part all the conditions specified in this act, and it is the duty of the Secretary of the Interior, in the event that the conditions specified in the act are not reasonably complied with and carried out, to report the facts, after notifying the City and County of San Francisco in writing, to the Attorney-General for such suits or proceedings in the proper courts as the law and the facts in his opinion warrant. The Secretary should not act at this time, but must await such development of facts as will enable the Secretary to determine with a certainty whether or not this act is being reasonably carried out by the City and County of San Francisco.

The violation of the law, if any, is a fact evidenced by acts, and the Secretary must necessarily await a reasonable time until performance shall have indicated whether or not the acts of the parties constitute such a violation of the law as will make action on his part proper.

The plant, which was shut down on account of damage to two of the penstock lines caused by an operating error on June 30 (Journal of Electricity, July 15, p. 66, and Aug. 1, p. 103), began delivering power from one unit to the Pacific Gas and Electric Company on Aug. 14. Announcement now is made that all four generating units are in operation.

Immediately following the announcement that power was being delivered by the city of San Francisco from the Moccasin plant to the power company the Modesto and Turlock Irrigation Districts petitioned the Secretary of the Interior to cancel the grant made to the city under the Raker Act on the grounds that such delivery constituted a violation of the act.

Industrial Lighting Campaign in Pacific Division Opened

The first gun of the N.E.L.A. industrial lighting committee's campaign in the Pacific Coast Division has been fired by A. M. Frost, sales manager, San Joaquin Light & Power Corporation, Fresno, Calif., who is geographic chairman of the division. This initial attack is in the form of two letters, one addressed to central station executives in the Pacific Coast Division, consisting of the states of California, Arizona and Nevada, and the other addressed to manufacturers of industrial lighting fixtures and their jobbers.

In the letter to central station executives, a copy of which is enclosed in the letter to the manufacturers and jobbers, Mr. Frost asks for cooperation in organizing the movement in the Pacific Coast Division and requests that each central station executive, manufacturer and jobber appoint someone in his organization to handle the activity, in cooperation with the chairman, in that organization. Mr. Frost further emphasizes the present poor status of industrial lighting and points out the opportunity that will be presented through national advertising and through contact with industrial executives, by means of central station salesmen, jobber salesmen, electrical leagues, and contractor-dealers, to develop an appreciation of the great value of proper industrial lighting, which can be capitalized immediately through the sale of better equipment, resulting in an immediate increase in kilowatt-hour sales.

Mr. Frost adds that he hopes to have an early meeting for the purpose of organization and discussion of general plans and that at this meeting appointment of leaders for the various sections of the Pacific Coast Division and of leaders for central special activities may be decided upon.

Baker River Plant Expected to Be Completed in October

The Baker River plant of the Puget Sound Power & Light Company, Seattle, Wash., is expected to be completed early in October, in spite of the numerous construction difficulties encountered on this project. Erection of the dam has been retarded at both ends, on the west by the necessity of keeping the railroad open and on the east by some additional excavation at high level. However, on Aug. 11 concrete in the central portion had been poured up to the spillway level, and form work to the highest point was in place. This dam, which is one of the highest, if not the highest, overpour type ever built, is 234 ft. from lip of spillway to stream bed below.

There are now on the project about 1,300 men at work. This, however, is about 300 below normal for this stage of the construction. The shortage is due to the demand for men to fight the forest fires in that section.

The transmission line has been completed, with the exception of two miles next to the power house.

Washington Utility Applies for License for Columbia River Project.—The Washington Water Power Company, of Spokane, Wash., has applied for a license for a project on the Columbia River at Hayes Island. It is proposed to build one dam above the upper falls and another at the lower end of Hayes Island. This will make available 150,000 continuous horsepower and 80,000 secondary horsepower, it is estimated.

Hydroelectric Project Planned at Prices Lake, Wash.

Permission to construct a reservoir at Prices Lake in Mason County, Wash., to store 25,000 acre-ft. of water for hydroelectric purposes is sought by the Lilliwaup Land & Resort Company of Lilliwaup, Mason County, according to an application which has been filed with R. K. Tiffany, state supervisor of hydraulics, by A. W. Layne of Lilliwaup, president of the company.

The project is to cost \$200,000, according to the application, which states that construction is to begin on or before Jan. 1, 1927, and is to be completed by Jan. 1, 1929. Construction details have not been completed. However, the impounding dam is to be 100 ft. high, 700 ft. long on top and 200 ft. long on the bottom. The company proposes to take water at a 500-ft. head. The reservoir is to extend over 200 acres when submerged. It will have a maximum depth of 90 ft. and an average mean depth of 50 ft.

According to Mr. Layne, his company already has water rights near the mouth of Lilliwaup River.

Permission to appropriate 250 sec. ft. of water from the Lilliwaup River, near the point where the Lilliwaup Land & Resort Company proposes to erect its reservoir, is sought by the Lilliwaup Power and Water Company, 206 First Avenue, South, Seattle, according to an application which this company filed with the state supervisor Aug. 10. This company likewise proposes to erect a \$200,000 power plant, should its application be granted. The plant would have a maximum capacity of 2,000 hp. at a fall of 150 ft.

No further Work to Be Done on Aberdeen Project Until Status Decided.—The city council of Aberdeen, Wash., has postponed until next year consideration of a proposition to make bedrock tests at the proposed dam site of the city water and power project on the Wynooche River. In order to make proper tests, S. C. Watkins, water superintendent, states it will be necessary to drill 1,500 ft. at an approximate cost of \$11,000. City councilmen held the opinion that any additional improvements or work on the project should be delayed until the state hydraulic engineer hands down his report on whether the city will be allowed to go ahead with the development of the hydroelectric power plant there.

Oregon Utility Begins New Transmission Line.—The Pacific Power & Light Company, Portland, has begun construction work on a 66-kv. transmission line extending from Pomeroy, Wash., to Clarkston, Wash. Material has been delivered along the line, and pole holes have been dug for two or three miles out of Pomeroy.

Edison Company to Start Work on New 220-kv. Transmission Line

On Sept. 1 the advance guard of an army of 800 construction men will begin building the third 220-kv. transmission line between the Big Creek-San Joaquin power houses of the Southern California Edison Company and the city of Los Angeles, covering a distance of 231 miles at a cost of approximately \$11,000,000. The electrical carrying capacity of the new line will be 200 000 hp.

This new transmission line will begin carrying power from the high Sierra to southern and central California by Jan. 1, 1927, when the enormous growth in the demand will require additional transmission. The industrial survey of the Edison-served territory commenced several years ago by R. H. Ballard, executive vice-president and general manager, shows that the time has arrived for preparing for the year 1927. July, 1925, showed an increase of over 148,000 hp. for lighting, industrial expansion and agriculture, as against July, 1924.

Of the \$11,000,000 which this line and auxiliary buildings with equipment will cost, nearly \$6,000,000 will be expended for land, labor, supplies and material purchased locally. The labor on the job will require the expenditure of approximately \$3,000,000 for wages.

More than eighty miles of new road, in addition to the existing highways, will have to be built by the Southern California Edison Company to enable it to deliver the material to the tower sites along the line. These roads will be turned over to the public after they have served their purpose of carrying approximately 8,500 tons of material and supplies, and their construction and the large amount of blasting over the mountain regions will require the purchase of more than fifty tons of blasting powder which will also be manufactured in California.

Permanent and portable abodes numbering from 250 to 300 will be established for the working force. Practically all of the supplies for provisioning the workmen will be purchased from local merchants and producers. As an illustration of the enormous quantity of supplies necessary for a construction campaign of this character, the commissary department of the Southern California Edison Company has submitted to the executives the following approved estimate of the major items: 300,000 lb. of flour, 70,000 lb. butter, 80,000 doz. eggs, 45,000 lb. coffee, 38,000 lb. compound, 32,000 gal. canned fruit, 50,000 lb. dried fruit, 165,000 lb. fresh fruit, 750,000 lb. ice, 16,000 gal. evaporated milk, 270,000 lb. sugar, 26,000 gal. canned vegetables, 30,000 lb. dried vegetables, 143,000 lb. fresh vegetables, 400,000 lb. potatoes, 270,000 lb. fresh beef, 45,000 lb. fresh pork, 56,000 lb. veal, 60,000 lb. assorted meats, 45,000 lb. bacon, 60,000 lb. ham.

The transportation of a total tonnage of 8,500 tons of material, in addition to conveying the men to the camps and from camp to camp as the work progresses, will require large additions to the company's present automotive equipment. Construction tools and equipment, such as shovels, picks, axes and the like, will be purchased from local merchants as the work progresses.

Road-building equipment is scheduled as a separate item and consists of tractors, road graders, road plows and similar equipment.

As the new line will traverse territory ranging from ten to thirty miles from the existing lines, an entirely new communication system will be built which will be 300 miles in length, requiring 9,000 poles, 1,200 miles (or 316,000 lb.) of copper wire, 10,000 cross-arms and 40,000 insulators.

Very important to the service of the community and its permanent development is the \$3,244,000 item of estimates for additions to the substations at Eagle Rock on the north side of Los Angeles and Laguna Bell on the east side, these two stations being at the receiving ends of the two load centers of industrial southern California. In addition to this expenditure, there will also be an expenditure of three-quarters of a million dollars for switching stations, one located at Magunden in the San Joaquin Valley, half way between the generating stations and Los Angeles, and the other at Cresenta, the terminus of the new line.

While the work of constructing this new transmission line is in progress, activities in tunnel construction and power-house building are going on coincidentally on the Big Creek-San Joaquin River project of the company.

Power Project Planned on Cispus River in Washington

Application to appropriate 1,000 sec. ft. of water from Walupt Lake Creek, tributary of the Cispus River in Lewis County, Wash., and to construct a reservoir on Walupt Lake that will store 50,000 acre-ft. of water, both for hydroelectric purposes, has been made to R. K. Tiffany, state supervisor of hydraulics, by H. L. Gilbert, 313 Couch Building, Portland. The estimated cost of the project is not given, Gilbert stating in his application that no estimate of the cost is available and that construction details have not been completed. Construction dates have not been decided upon, he adds.

The impounding dam, which is to be of concrete construction, is to be 100 ft. in height and 1,800 ft. long on top. The area to be submerged by the reservoir when full will be 500 acres. The maximum depth of the reservoir is not known. The storage, according to the application, is contemplated for augmenting the water flow of the Cispus River for use in connection with a projected power plant on the Cispus River.

Technical Error in Advertising Bids for Diversion Dam of Cushman Project Second Unit.—Because of a technical error in advertising the bids, contractors' figures for the construction of the diversion dam in the second unit of the Cushman power project under development by the city of Tacoma, Wash., were not received by the city light department on the date set. According to a ruling of the city attorney, the council should have authorized the bids by resolution, and contractors were notified that this must be done before any figures can be considered. The work is estimated to cost \$100,000.

Western Red Cedar Association Creates Research Division

At a special meeting of the Western Red Cedar Association recently held in Spokane, Wash., a research division was established with headquarters in Chicago. Kurt C. Barth was appointed director. The program outlined for the research division, according to the announcement of the association, contemplates complete service, alike, to the consumers and the producers, providing an agency whose sole duty is to advance their mutual interests.

Among the more important features are the co-ordination of producing conditions with consumers' needs, and vice versa; a collection of physical data, service records, and all technical information helpful to engineers and buyers responsible for the employment and purchase of western red cedar poles. Constant attention is to be given to all factors of production, distribution and treatment, so that the product of each member of the association may be maintained at the highest standard of quality and value. To this end every effort will be made to cooperate with all technical and other organizations interested in, or dealing with, conductor supports.

From time to time pertinent literature will be made available for general distribution; but in a large measure the service offered to pole consumers of necessity must be of a more personal nature, dealing particularly with specific problems. Those desiring information about western red cedar poles should address the Research Division, Western Red Cedar Association, 5 South Wabash Avenue, Chicago.

Sir Adam Beck of Ontario Hydro Commission Dies

Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission since its organization nearly eighteen years ago, died at his home in London, Ont., Aug. 15. Sir Adam began his political career in 1902 when he was elected to the Provincial Legislature of Ontario. He immediately became interested in the development of electric power at Niagara Falls and a year later was appointed to a commission to investigate the possibilities of power development. Three years later he introduced a bill which created the Ontario Hydro-Electric Commission and upon the formation of this body was appointed its chairman. He has been an active advocate of municipal ownership throughout his entire career and has been largely responsible for the growth and development of the Ontario system.

Ellensburg, Wash., Orders Report on Municipal Plant.—The city of Ellensburg, Wash., has commissioned Barr & Cunningham, engineers, Portland, Ore., to prepare a report on the proposed improvement and enlargement of the city hydroelectric plant. An offer by the Puget Sound Power & Light Company to buy the municipal electric plant for \$270,000 led the city to seek the present survey and report on its system to determine whether it would be advisable to sell or to enlarge the plant under municipal ownership. The present capacity of the plant is 1,500 kw. developed by three turbines. Additional turbines probably will have to be added to develop greater capacity.

New Officers Elected by Pacific States Electric Company

At a meeting of the board of directors of the Pacific States Electric Company in San Francisco on Aug. 18 D. E. Harris was named president to fill the position left vacant by Tracy E. Bibbins, who died last month.

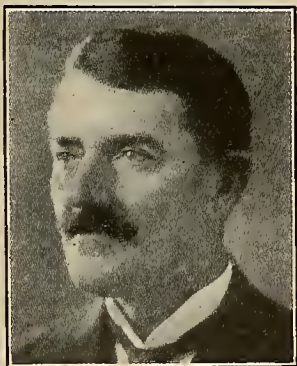
Mr. Harris started his electrical career twenty-seven years ago as office boy for the company of which he is



D. E. HARRIS

now the head. He is one of the outstanding figures of the electrical industry in California, and has been connected intimately with the development and expansion of the use of electrical appliances. Mr. Harris was one of the organizers of the California Electrical Bureau and aided in sponsoring the first electrical homes displayed in California. He also has been active in the work of the Pacific Coast Electrical Supply Jobbers Association.

At the same time the company announced the election of H. R. Noack,



H. R. NOACK

vice-president of the company, to the board of directors. Mr. Noack entered the electrical industry in 1898 with John Martin, who represented the Stanley Electric Manufacturing Company and the Locke Insulator Company. Mr. Noack was active with Mr. Martin in effecting the consolidation of a number of early power companies which later became the basis of the Pacific Gas and Electric Company system.

The John Martin Company later became Pierson Roeding Company. Mr. Noack retained his interest in this company until 1917 when he joined the force of the Pacific States Electric Company. He is head of the high-tension transmission department of the Pacific States company and has been a vice-president since 1921.

Water Rights Applied for in Proposed Power Projects

Among the applications for permission to appropriate water that have been filed recently with the California Department of Public Works, Division of Water Rights, are several which are seeking water for use in the generation of electric energy.

J. N. Turner, in care of R. B. Swayne, 201 Sansome Street, San Francisco, has applied for the diversion of 37.5 sec.-ft. and storage of 6,400 acre-ft. of water in Plumas County from Jamison, Downieville Fork, Deer and Bear Creeks tributary to the Middle Fork of the Feather River. This project is estimated to cost \$100,000.

The Western States Gas & Electric Company, through Chickering & Gregory, Merchants Exchange Building, San Francisco, has applied for permission to store annually 7,500 acre-ft. from Silver Fork, tributary to the South Fork of the American River, for diversion in connection with its El Dorado power project in El Dorado County.

The Feather River Power Company, Hobart Building, San Francisco, has filed application for permit to store 80,000 acre-ft. of water per annum from the Middle Fork of the Feather River to be diverted in connection with its proposed \$1,250,000 hydroelectric power project in Plumas County.

In connection with its Kings River project, which it is estimated will cost \$10,000,000, the San Joaquin Light & Power Corporation, Fresno, Calif., has applied for 330 sec.-ft. of water for diversion from the North Fork of the Kings River, Fleming Creek, Post Corral Creek and Helms Creek, tributary to the North Fork of the Kings River and Kings River, and 86,000 acre-ft. storage per annum, in Fresno County, for the generation of 60,750 theoretical horsepower.

Plan Power Project on Jamison Creek, Plumas Co., Calif.

Application has been made to the Federal Power Commission by Swayne, Leland & Turner, San Francisco, for a preliminary permit covering a power project on Jamison Creek and its tributaries in Plumas County, Calif. The project is near the towns of Johnsville and Blairsden. It is proposed to construct four reservoirs drawing water from Eureka Lake, Deer Creek and Poplar Creek. A ditch and flume will carry the water 4,600 ft. from Deer Creek to Eureka Lake, thence through an iron pipe to power house No. 1.

Eureka Lake stores 2,600 acre-ft. Reservoirs A, B and C would have a storage capacity of 4,800 acre-ft. Power plant No. 2 will be in Jameson City and will operate under a head of 426 ft. Power plant No. 3 will have a head of 416 ft. The total primary power which this development would make available is 5,195 hp. The power is for public utility use.

Defunct Utility to Be Sold at Auction.

—The defunct Sherman County Light & Power Company at Centralia, Wash., operating in Lewis County, will be sold at auction Sept. 16 to satisfy a judgment for \$259,251.71 recently given in the superior court in favor of the Portland Trust & Savings Bank. Property to be sold includes a transmission line between Centralia and Chehalis.

Irrigation District Application for Rights Reconsidered

In view of new data submitted by the Nevada Irrigation District in connection with its application for rights on the Yuba River, the staff of the Federal Power Commission is reconsidering the matter. The executive secretary of the commission on June 6 tentatively rejected the application of the irrigation district but with the proviso that consideration would be given additional information bearing on the project and calling attention to the right of the applicant to carry the case before the three cabinet officers who form the commission. The irrigation district has decided to avail itself of that suggestion in case the staff of the commission on reconsideration should report unfavorably.

The commission's engineers questioned some of the estimates which had been made on construction work. The irrigation district now presents actual bids to substantiate its figures as to the cost of structures.

The application of the irrigation district is in conflict with those of the Yuba River Power Company and the Excelsior Power and Water Company. The application of the Excelsior company also was rejected, and the Yuba River company was asked to establish its state rights.

Final Hearing on Girand Colorado River Project Oct. 20

The final hearing before the Federal Power Commission in connection with the Girand project at Diamond Creek on the Colorado River (Journal of Electricity, Aug. 1, 1924, p. 104 and Dec. 1, 1924, p. 416), has been postponed until Oct. 20. The time had been fixed tentatively for the first week in September, but on the application of those opposing the license and with the concurrence of Mr. Girand, the commission has set the new date.

The commission asks that objections be filed in writing prior to the meeting, but an opportunity for oral argument will be afforded at the hearing, regardless of whether documents have been filed.

Electric Sugar Mill to Be Erected in Colorado.—The construction of two factories, both to be electrically operated, has been announced by the Great Western Sugar Company with headquarters in Denver. The first is at Johnstown, Colo., and the second at Ovid, Colo., in the northeastern part of the state, where a new town will be established as a result of the decision to locate a factory at that point. Whether or not the Industrial Sugar Company plant at Fort Lupton, Colo., which has just been purchased by the Great Western company, will be removed to either of the places named is uncertain. The latter plant was constructed at the same time as its neighbor at Brighton, said to be the model plant of the company. The Great Western is also making extensive additions to its Steffens molasses plant at Fort Collins.

Panama Lamp & Commercial Company Receives San Francisco Contract.—The contract for one year to furnish lamps for the city of San Francisco recently was awarded to the Panama Lamp & Commercial Company, 1066 Mission Street, San Francisco.

Construction Program of Southern Colorado Power Company

Surveys have been completed for the new 66,000-volt transmission line to be built by the Southern Colorado Power Company, Pueblo, between that point and Canon City, according to W. N. Clark, general manager. The line will be used to increase the power service in both the Pueblo and Canon City districts and also to afford greater interchange capacity between the Pueblo steam plant and the steam plant at Canon City. Plans and specifications for new receiving stations at both ends of the line have been prepared.

The company is investigating the practicability of developing water power on Grape Creek near Canon City and also on Beaver Creek below the present Skaguay hydroelectric plant, there being a fall of about 1,500 ft. within a comparatively short distance of that plant. Comparison then will be made between the cost of developing this hydroelectric power and the construction and operating costs of additional steam plant capacity.

To provide for the increased business in the La Junta district, including the town of Las Animas, plans and specifications have been prepared for increasing the capacity of the La Junta substation.

Westinghouse Electric Company of Japan Newly Organized

The Westinghouse Electric Company of Japan, incorporated under the laws of the State of Delaware with a capital of \$1,000,000, is a newly organized subsidiary of the Westinghouse Electric International Company. The officers of the new company are: Guy E. Tripp, chairman; L. A. Osborne, president; E. D. Kilburn, vice-president; and I. F. Baker, managing director, located at Tokyo.

The purposes of this company, according to Mr. Kilburn, are to distribute Westinghouse products throughout Japan and to arrange for proper service to the many old as well as the new users of Westinghouse apparatus in Japan. The staff in Japan will be almost entirely Japanese.

Plans Well Under Way for Meeting at Camp Cooperation V

Great interest is being manifested in Camp Cooperation V, the fourth conference of electrical leagues to be held at Association Island, Henderson Harbor, N. Y., Sept. 8-12, according to advices from The Society for Electrical Development, Inc., which, in cooperation with the League Council, is sponsoring the meeting.

The conference will open Tuesday morning with a flag-raising ceremony followed by an address of welcome by W. W. Freeman, president of The Society for Electrical Development. The first actual business meeting is scheduled for Tuesday evening, at which Earl Whitehorne, commercial editor, Electrical World, New York, will speak on "The Status of the Leagues Today." This will be followed by five-minute reports by fourteen leagues and general discussion.

"Organizing a League," "Planning and Managing the League's Activities," "Keeping League Supporters Informed," and "The Social Side of the League's

Activities" are some of the subjects to be discussed on Wednesday. Among the topics on the program for Thursday are "Local League Work from a National Viewpoint," "Local Legislation and Application," "League Activities in the Industrial Field," "Industrial Lighting Campaign," "Organizing the Industry for Massed Effort Nationally," and "What Women Want to Know About Electricity in the Home".

"The Red Seal Plan" is to be discussed on Friday by W. L. Goodwin who also will give the summing-up of the League Conference. There will also be five-minute reports on local operation, committee reports, open questions and discussion, and a banquet will be given in the evening. On Saturday morning league secretaries and secretary-managers will hold a special session.

The sports committee has made plans for golf, tennis, boating, yachting, swimming and other recreation, and other committees have been formed to take charge of reception, transportation, entertainment and other details.

Horse Mesa Dam Excavation to Be Completed in October

Work on the excavation for the Horse Mesa dam of the Salt River Valley Water Users' Association is expected to be completed late in October, according to recent press dispatches, when pouring of the cement for the foundation will be started. Jan. 1, 1926, is set as the estimated date when the dam will be finished.

This structure, which is being erected about 17 miles below the association's Roosevelt dam, will be 300 ft. high and will impound 300,000 acre-ft. of water (Journal of Electricity, Oct. 15, 1924, p. 302). The plant, in which three generating units will be installed, will have a capacity of 34,000 kw.

Petition Approved for Ornamental Street Lighting on East Orange Grove Avenue, Pasadena.—Petition of seventy-five property owners to have an ornamental lighting system installed on East Orange Grove Avenue, between Hill and Allen Avenues, Pasadena, Calif., has been approved by the city board of directors.

Illuminating Engineers Discuss Lighting Safety Orders

Recommendations for the General Lighting Safety Orders of the Industrial Accident Commission of California were discussed at a recent meeting of the San Francisco Bay Cities Chapter of the Illuminating Engineering Society. A committee from the organization appeared before the commission at a public hearing held at the State Building, San Francisco, on Aug. 18. At this hearing it was decided that the Orders would remain as they are at present until such time as the commission is ready to consider a revision of the General Safety Orders.

It is the opinion of the commission that an attempt should be made to simplify the General Lighting Safety Orders as they now exist so that they may be more readily understandable. It was requested that the Illuminating Engineering Society appoint a committee to prepare a suggested set of Lighting Safety Orders to be used as a basis in preparing the tentative Orders at the time of the revision. This committee is expected to present its report within six months.

Light Department of Tacoma, Wash., Files Budget.—Expenditures of the municipal light department of Tacoma, Wash., for 1926 will amount to approximately \$2,600,000, according to the budget estimate filed with the city controller by Ira Davisson, commissioner of light and water. This amount is \$300,000 under the actual expenditures for the last fiscal year, which totaled \$2,915,274. The net income of the department for the first six months of 1925, ending June 30, was \$481,223.77, and operating revenues amounted to \$789,603.15, according to report recently submitted by Mr. Davisson.

Monroe City, Utah, Applies for License for Auxiliary Plant.—Monroe City, Utah, has applied for a license covering a proposed auxiliary plant to be constructed on Monroe Creek near an existing municipal plant. Only 147 hp. of primary power is available. It is planned to make emergency use only of the proposed development.



To cooperate with both dealers and power companies Alexander & Lavenson Electrical Supply Company, San Francisco, is sending through northern and central California the truck, shown above, in which are two models of the L & H electric range. The ranges are taken from town to town and are exhibited and demonstrated wherever it is thought practical.

Ultimatum Delivered by Governor Hunt at Tri-State Meeting

Confronted by an ultimatum from Governor Hunt outlining Arizona's stand with reference to any development of the Colorado River, a tri-state conference between California, Nevada and Arizona called for the purpose of discussing the mutual interests of those states broke up following its initial meeting on Aug. 17, 1925, at Phoenix, Ariz.

The conference was between committees appointed by the California and Nevada legislatures and a committee appointed by Governor Hunt to take preference over a similar body of representatives appointed by the Arizona legislature.

In his speech before the conference Governor Hunt made an extended attack on the Colorado River Compact and enunciated the principle that Arizona expects to become proprietor state over any development of the river within its border and to "derive revenue from any development of the river in whatever manner the laws devise." He implied that Arizona was experiencing no pressing need for development of the river and is willing to retard development until the other states are willing to purchase water and power or until the needs of Arizona dictate action. Governor Hunt's speech will be published in full in the next issue of the *Journal of Electricity*.

In the meantime the upper basin states tentatively had set Aug. 27 as the date for a meeting at Denver of representatives of Utah, Colorado, Wyoming, and New Mexico for the purpose of coming to some agreement whereby the resources of the stream may be utilized.

Report on Potential Water Power Along Columbia River

One-seventh of the potential water power in the United States is to be found along the Columbia River, exclusive of the very large power resources of its tributaries, according to a recent announcement of the Department of the Interior. This department, through the Geological Survey and other bureaus, gradually has been accumulating the records needed for determining the possibilities of utilizing the Columbia River.

Over 8,000,000 acres of land can be irrigated within the drainage area of Columbia River, of which about 3,600,000 acres are irrigated now. The river can be made navigable from its mouth to the international boundary, a distance of 760 miles, if proper foresight is exercised in the location of dams constructed primarily for use in developing water power.

The engineers of the Geological Survey have made several preliminary estimates of the water-power resources of the Columbia River proper. The latest estimate, shown in the accompanying table, takes into account all factors which are likely to influence the flow in the future.

The regulated flow as given in the table represents the flow estimated to be available when ultimate possibilities for irrigation have been served; when allowance has been made for a supply sufficient to maintain navigation, amounting to 500 sec.ft., above Wenatchee River, 750 sec.ft. between Wenatchee

SUMMARY OF POTENTIAL POWER ALONG COLUMBIA RIVER FROM THE INTERNATIONAL BOUNDARY TO ITS MOUTH

(Horsepower at 70 per cent efficiency)

Sites and Stretches	90 per cent of the time	50 per cent of the time
At nine dam sites:		
Natural flow.....	2,726,000	5,427,000
Regulated flow.....	3,297,000	5,480,000
In stretches within which information is inadequate for determining sites:		
Natural flow.....	1,228,000	2,415,000
Regulated flow.....	1,498,000	2,497,000
Total:		
Natural flow.....	3,954,000	7,842,000
Regulated flow.....	4,795,000	7,977,000
Total in Washington:		
Natural flow.....	3,108,000	6,354,000
Regulated flow.....	3,546,000	6,568,000
Total in Oregon:		
Natural flow.....	846,000	1,488,000
Regulated flow.....	949,000	1,408,000

and Snake Rivers, and 1,000 sec.ft. below Snake River; and when storage has been regulated for the direct benefit of power sites immediately below reservoir sites at Hungry Horse (South Fork of Flathead River), 1,200,000 acre-ft.; Flathead Lake, 1,600,000 acre-ft.; Priest Lake, 360,000 acre-ft.; Chelan Lake, 450,000 acre-ft.; Wenatchee Lake, 835,000 acre-ft.; and Chiwawa, 318,000 acre-ft. Utilization of the storage available in Pend Oreille and Coeur d'Alene Lakes is assumed to be necessary for the development of the Columbia Basin irrigation project.

Utility Awards Prizes to Winners in Employees' Examination

Awarding of prizes to the twenty contestants receiving the highest grades in the recent examination held for the employees of the Los Angeles Gas and Electric Corporation took place Aug. 7 at an enthusiastic gathering in the assembly hall of the company's building. William Baurhyte, president, A. B. Day, vice-president and general manager, and other company officials were present. One hundred and ten employees were enrolled in the examination, which was the culmination of a six



N. H. BRADSHAW

weeks course of lectures and study covering the utility's gas and electric manufacturing and distributing systems, general office routine, and other matters of information about the conduct of the corporation's business.

The first prize, a trip as the guest of the corporation to the convention of the Pacific Coast Gas Association, held at Portland, Ore., Aug. 17-21, was won by N. H. Bradshaw of the accounting department with a score of 99½ per cent.

The other nineteen prize winners, in the order of their grades were: C. D. Cushman, W. M. Fisher, William Maddock, G. M. Sadler, F. O. Young, M. L.

Cornforth, P. C. Kuntz, W. C. F. West, P. A. Patchen, W. C. Houser, F. L. Washburn, P. R. Aikman, F. L. Moon, L. V. Eddy, R. M. Robinson, Calvert Coates, L. S. Pederson, F. S. Gillellan, A. T. Vawter. These men received prizes of useful electrical appliances, silverware, fishing equipment and the like.

Exide Battery Assembly Plant to Be Built in San Francisco

Announcement has been made that the Electric Storage Battery Company, of Philadelphia, manufacturers of Exide batteries, is planning the erection of a large assembling plant and warehouse for the purpose of rendering better service to its customers on the Pacific Coast and in the Hawaiian Islands.

The company has purchased a piece of property on Third Street, just north of Paul Avenue, with an area of 82,500 sq. ft., on which it plans to erect a modern factory-type reinforced concrete building at an estimated cost of \$200,000, exclusive of the cost of the property. In the rear end of the structure, which will be one-story in height at that point, about 45,000 sq. ft. of space will be provided for assembling, shipping and warehousing. The front of the building will be two stories high, the general offices of the branch to occupy the top floor.

G. R. Murphy, manager of the Pacific Coast division, is quoted as saying that the steady growth of the business had decided company officials to change the policy of leasing headquarters and establish a permanent home on the Pacific Coast for the better service of its customers.

Los Angeles Seeks Uniform Type of Ornamental Lighting Posts.—Hoping to effect economies through the application of the principles of standardization, the Los Angeles city council has requested the assistance of the city attorney and the city art commission in the obtaining of a new type of ornamental lighting post which may be used by any of the manufacturers. At present the posts used are patented, and each company can set any price it wants on its product. It also was pointed out that with a uniform style of posts the city will present a better appearance. In several sections, two or more types of posts now are being installed on the same street.

Washington Utility Secures Street-Lighting Contract.—The city council of Toledo, Wash., has awarded to the Puget Sound Power & Light Company a contract for furnishing street lighting current for a period of ten years.

Electric Home at Aurora, Colo., to Be Community Affair

An electric home to be displayed as a community affair shortly will be featured at Aurora, Colo., a suburb of Denver. Although the local central station is interested in the activity, other business men, including a prominent banker, have supplied the necessary funds for advertising and displaying the home, which is said to be of an unusual type of construction and the largest residence to be built in that suburban community.

When the home is completed and furnished, it will be displayed with younger members of the Women's Commercial Club of Aurora serving as hostesses. Entertainment features to be held nightly at the home include aeroplane flights, band concerts, army maneuvers and other spectacular events that are likely to attract a considerable number of visitors from the city.

The home is located on one of the main paved thoroughfares leading eastward out of Denver, and occupies a commanding position at the entrance to the town of Aurora. Business men of the town feel that the home, together with the entertainment features, should prove a real community attraction and one that will advertise Aurora.

Frank Gilligan, owner of the home and former utility man, and C. A. Einfeldt, head of the Suburban Light & Power Company, together with Merle Jordan, local manager of that company, are the key men in the undertaking. The Electrical Cooperative League of Denver is serving as adviser and counsel in the undertaking.

Pacific States Electric Company Opens San Diego Branch

The ninth branch office and warehouse of the Pacific States Electric Company recently was opened at 206 West Market Street, San Diego, Calif. It will carry full stocks on a complete line of electrical merchandise. R. A. Pearson has charge of the new branch, having been transferred from the Portland branch of the company.

The Pacific States Electric Company now has branches in San Diego, Los Angeles, Long Beach, San Francisco, and Oakland, all in California; Phoenix, Ariz.; Portland, Ore.; Seattle and Spokane, Wash. The opening of this additional store is another indication of the firm's optimism and faith in the future of the electrical industry on the Pacific Coast.

Herbert Hoover Is to Speak at Glenwood Convention

Herbert Hoover, Secretary of Commerce, and one of the principal speakers at the recent N.E.L.A. convention in San Francisco, has accepted an invitation to be the principal speaker at the annual joint convention of the Rocky Mountain division, N.E.L.A. and Colorado Public Service Association at Glenwood Springs, Colo., Sept. 14-17. "State versus Federal Regulation" will be the subject of Mr. Hoover's address Wednesday night, Sept. 16. Arrangements have been completed for broadcasting it from KOA, General Electric station in Denver.

Other speakers of national importance who will appear on the convention program are Miss R. E. McKee, M. H.

Aylesworth, W. R. Putnam, and Merrill Thorpe. Heber R. Harper, Chancellor of the University of Denver, and L. Ward Bannister, president of the Denver Chamber of Commerce and a member of Secretary Hoover's Colorado River commission also are listed as speakers.

The convention this year will last four days instead of three as heretofore. Morning and evening sessions will be held, leaving the afternoon for sports and entertainment. Aeroplane service will be maintained between Denver and Glenwood Springs for prominent guests and any who may arrive late for the convention.

B.C. Electric's Option for Bridge River Site to Be Renewed

In view of the inability to complete diamond-drill borings at the dam site of the proposed Bridge River hydroelectric project located about 125 miles from Vancouver, the option to purchase the project held by the British Columbia Electric Railway Company, Ltd., will be renewed by the Bridge River Power Company, holder of the original water rights, according to reports from Vancouver.

The option was secured in order that studies might be made to compare the advantages of the Bridge River development with that of the proposed Ruskin plant some three miles below the existing plant of the company on Stave River. One of these two projects is believed to be the next logical addition to the company's system.

Edison Company to Start Work on Shaver Lake Railroad

Work on five miles of single-track, standard gage railroad between Dawn station on the San Joaquin & Eastern Railroad and Shaver Lake is to be commenced immediately by the Southern California Edison Company. This line is to be built to transport the materials which are to be used in the construction of the combination conduit and tunnel between Huntington and Shaver Lakes and of the dam to be erected at Shaver Lake.

Climax locomotives such as are used on the mountain grades by the San Joaquin & Eastern Railroad will be used. The road will have a maximum grade of 4 per cent. Present plans call for completion of the work Dec. 1, 1925.

Contracts for Cement Mill Electrical Equipment Awarded.—Contracts for the first units of the electrical equipment of the new cement plant at La Porte, twenty miles west of Fort Collins, Colo., that is being erected for the Colorado Portland Cement Company, Denver, have been let to the Westinghouse Electric & Manufacturing Company. Construction will start shortly. The completed mill will cost about a million and a half dollars. It will be electrified completely.

Tacoma Steam Plant Shut Down.—The city light department of Tacoma has closed its steam power plant for the summer, in the interest of economy, except for the turning of a generator as a regulation on voltage factors. The boilers will remain cold until September, any steam being needed to be purchased from the Consumers Central Heating Company.

California Wholesale Electric Opens Establishment

A new electrical supply jobbing house recently has been established in Los Angeles by five former employees of the Pacific States Electric Company. The company is incorporated under the name of the California Wholesale Electric Company. It has leased a recently completed two-story brick building at 413 East Eleventh Street that is well adapted to the needs of an electrical jobber, and provision has been made for efficient loading and unloading in order to facilitate service.

H. C. Chapman, president of the concern, has been district treasurer of the Pacific States Electric Company for the past ten years. E. G. Snow, the vice-president, had been with that company for fifteen years in various capacities. Tom Slee is secretary-treasurer; he was chief accountant in the former company for twelve years and later assistant district treasurer. W. D. Hughes, assistant secretary, was with the Pacific States company for more than five years. J. G. Cook, the other member of the firm, had been a salesman for the same company for several years.

The California Wholesale Electric Company is handling standard lines of merchandise and following the trade policies practiced by the highest type of supply jobbers.

Byllesby Interests Acquire Another Wyoming Central Station.—Another Wyoming central station has been taken over by the Byllesby interests and merged with the recently formed Mountain States Power Company in the purchase from the Illinois Power & Light Corporation of the Douglas Light & Power Company, Douglas, Wyo. The company will be directed from Casper, Wyo., by W. D. Johnston, manager of the central station in that city, formerly known as the Natrona Power Company. G. M. Brewer of Albany, Ore., is vice-president and general manager of the Mountain States Power Company.

Mayor Vetoes Appropriation of \$13,000 Additional for Skagit Survey Commission.—Characterizing the proposed expenditure as "absolute waste" and an "irregular" payment of money to "satisfy some member or members of the city council who are desirous of making a name for themselves," E. J. Brown, mayor of Seattle, recently vetoed an appropriation of \$13,000 for the employment of engineers to continue the city of Seattle's survey of the Skagit power project (Journal of Electricity, Feb. 15, 1925, p. 147). A similar appropriation of \$12,000 several months ago was passed over the mayor's veto. The mayor holds that the commission was created illegally and that the investigation should be made by the city engineer's department.

Pasadena Considers Installation of Ornamental Lighting System on Certain Streets.—The Board of City Directors of Pasadena is considering the installation of an ornamental lighting system between Meredith and Santa Anita Streets and also on North Fair Oaks Avenue from Chestnut to Hammond Street. No decision has been reached as to type of posts to be used, but union metal posts seem to be favored.



News of the Electragists



H. H. Walker and C. F. Butte Head California Electragists

H. H. Walker, president of the California Electragists, started his career in the electrical industry in 1897 with the Southern California Edison Company. In 1914 he entered the electrical contracting business for himself. Mr. Walker is president of the Electrical Contractors and Dealers Association of Los Angeles, and chairman of the Southern Division of the California Electragists, in addition to the state organization. He fathered the amalgamation of the contractors of southern California with the Electragists. He is a member of the advisory committee of the California Electrical Bureau, a charter member of the Electric Club, and belongs to many civic and athletic organizations. Mr. Walker represents the Electragists on the construction industries joint committee of southern California. It is the duty of this com-



H. H. WALKER

mittee to endeavor to have all public work done by the contract method. Its activity covers the entire state.

Policies to be executed during his administration include: 1. Endeavor to carry out the Electragists' idea and thoroughly establish the name "Electragist" as representing responsible contractor-dealers. 2. Support the Red Seal Plan as being one of the most important and feasible programs before the electrical industry and one which will assist all branches. 3. Continue the efforts of the association to educate all contractors to conduct their business along lines of proper business ethics, working especially with the smaller contractors just starting in the business so they will be imbued thoroughly with Electragists' ideals as they advance in the business world.

C. Felix Butte, vice-president of the California Electragists and chairman of the Northern Division, was born and raised in San Francisco. During school vacations he worked for the old California Electrical Works and the Electrical Supply Company. After completing his education in 1903, Mr. Butte became assistant to the superintendent of the Pacific Telephone and Telegraph Company. He later was in charge of the engineering department of the

Western Electric Company of San Francisco. In 1909 he purchased a half interest in the Butte Engineering and Electric Company, and upon the dissolution of this firm in 1919 he formed



C. FELIX BUTTE

the Butte Electrical Equipment Company with himself as owner. Mr. Butte is a member of the Electrical Development League, the National Credit Association, the Builders Exchange and many other business and civic organizations.

In a recent interview, Mr. Butte stated it would be his endeavor to consummate the following policies in the Northern Division: 1. Secure satisfactory attendance at all meetings by having subjects of vital interest to all members presented at the sessions. 2. Maintain closer human relationship between members. 3. Advocate the adoption of logical channels of trade. 4. Adoption of sound business standards and principles. 5. Maintenance of membership interest by closer contact between the various sections. 6. Aid the activities of the California Electrical Bureau. 7. Universal adoption of the Red Seal Plan. 8. Harmonious relationship between competitors. 9. Publicity through the columns of the Journal of Electricity. A more detailed account of these activities will be given in future issues of the Journal.

Electragists, International, Plan Quarter-Centennial Meeting

Plans have been completed for the twenty-fifth annual convention of the Association of Electragists, International, which will be held Sept. 23-25, at the West Baden Hotel, West Baden, Ind. J. H. Trumbull, governor of Connecticut, president of The Trumbull Electric Manufacturing Company, and former electrical contractor, will make the principal address before the convention.

All of the afternoon sessions of the convention will be executive sessions to which active members of the Electragists' association will be the only persons admitted. This is a departure from past precedent and undoubtedly will result in much freer discussion of the subjects before the delegates. The morning sessions will be open meetings, as in the past.

The very comprehensive program which has been prepared should make the results of this convention the most far-reaching of any convention of contractor-dealers that ever has been held. The trade policy report, code committee report, and labor section meetings, which will be taken up in the executive sessions are sure to cause considerable discussion by the delegates.

Addresses at the morning sessions will include "The Jobbers' View of Distribution," by O. Fred Rost; "Uniform Electrical Ordinance," by S. L. Nicholson; and one by Sherman L. Rogers, associate editor "Success". Various committee reports and discussions also will occupy the attention of the delegates.

The manufacturers' exhibit promises to be larger than that of last year when forty-four manufacturers displayed their products.

The entertainment committee has arranged a splendid program, and special emphasis has been placed on the entertainment of the ladies who will be present. From present indications a representative body of electragists from all parts of the country is planning to be present.

Organization Formed in Siskiyou County by Contractors

The Siskiyou County Electric Contractor-Dealer Association recently was organized at a meeting in Dunsmuir of contractors from that city, Yreka, Mt. Shasta, and Montague. The following are the charter members of the organization: Seavey Brothers, Dunsmuir, Electric Supply Company, and H. C. Schultz, both of Yreka; Tex Electric Shop, Mt. Shasta; and I. N. Scammell, Montague. J. A. Seavey, Dunsmuir, was elected president, and E. G. Millbourn, Yreka, secretary-treasurer.

Regular monthly meetings will be held on the second Monday of each month. The next regular meeting will be held in Yreka on July 13, opening with a banquet at the Yreka Inn at 7 p.m. At this meeting it is planned to discuss wiring methods and costs of installing electric ranges. Members and representatives of similar organizations are invited to attend. Future meetings will be held at the different cities in the following order: Yreka, Mt. Shasta, Montague and Dunsmuir.

Oakland Association Elects Officers.—The Electrical Contractors and Dealers Association of Alameda County recently elected the following officers: president, Henry Mellmann, Mellmann Electric Company; vice-president, C. D. Bronson, California Electrical Construction Company; treasurer, G. H. Andrews, Andrews Electric Company. Executive committeemen: A. R. Kolls, NePage-McKenney Company; E. C. Heister, Advance Electric Company; Walter Spencer, Spencer Electric Company. Laurence R. Chilcote is secretary-manager of the association.

Seth Cohn, of the Atlas Electric Company recently has moved into a new store at 233 Third Avenue, San Mateo, Calif. Mr. Cohn has been in business in San Mateo for the past eighteen years.

C. R. Hagen is now the proprietor of Hagen & Harris, 1125 Main Street, Napa.

Meetings

Advisory Committee of California Electrical Bureau Meets

Educational advertising to promote the extended use of electricity in agriculture, the Red Seal campaign, tentative administrative plans, and approval of the continued use of the traveling window lighting exhibit were among the important subjects discussed at a meeting of the advisory committee of the California Electrical Bureau held in Los Angeles Aug. 13.

R. E. Fisher, vice-president in charge of public relations and sales, Pacific Gas and Electric Company, San Francisco, and chairman of the advisory committee, presided. Attention was drawn to the forthcoming Camp Cooperation V to be held at Association Island, Henderson Harbor, New York, Sept. 8-12, under the auspices of the Society for Electrical Development, Inc., and Mr. Fisher was named to attend as representative of the Bureau.

W. L. Frost, general commercial manager, Southern California Edison Company, Los Angeles, reporting on the preliminary promotional work in behalf of the Red Seal campaign, spoke highly of the beneficial results achieved through the visit of H. L. Harper to the convention of the Electragists at San Diego, while H. H. Courtright, president and general manager, Valley Electrical Supply Company, Fresno, reported similar results at the Eureka convention of the northern division of the Electragists. Mr. Courtright also reported that a special campaign for the sale of appliances conducted by the Valley Electrical Supply Company during June Bride Week brought the sale of appliances for that period to a point more than 10 per cent in excess of the company's Christmas sales.

During the session it was brought out that nearly 2,000 copies of the Handbook of Electric Appliance Information have been distributed within the industry, and that a number of commendatory letters from various sources have been received on this work.

The terms of office of R. E. Fisher, W. S. Berry, P. H. Booth, W. L. Frost, H. H. Walker and F. H. Woodward having expired at the end of July, C. T. Hutchinson was elected chairman of the advisory committee, succeeding R. E. Fisher. The other vacancies on the board have not been filled yet, present incumbents holding office until their successors have been appointed.

The board approved a tentative plan for the administration of the Bureau presented by Mr. Fisher in behalf of the chairman-elect, with special recommendation that immediate attention be given to the active promotion of the merchandising division of the Electragists.

H. M. Crawford, sales manager, Pacific Gas and Electric Company, was elected to succeed R. E. Fisher as a member of the advisory committee. The committee unanimously expressed its sincere appreciation and thanks to Mr. Fisher for the time and effort that he has given to the promotion of the Bur-

eau, and a committee has been appointed to draft suitable resolutions to this effect.

A committee also was appointed to draft resolutions of regret at the death of T. E. Bibbins, president of the Pacific States Electric Company, expressing the great sense of loss to the industry by his passing.

Approval was given the plan submitted by Mr. Fisher providing for the continued use of the Bureau's traveling window lighting exhibit by each power company in the state. In view of the fact that the Pacific Gas and Electric Company offered to undertake this work within its own district immediately, the committee was unanimous in expressing its approval.

COMING EVENTS

National Radio Exhibition—

Third Annual—Los Angeles, Calif.
Sept. 5-12, 1925

Camp Cooperation V—

Conference of representatives of local electrical leagues—Association Island
Henderson Harbor, N. Y.
Sept. 8-12, 1925

Rocky Mountain Geographic Division, N.E.L.A.—

Annual Meeting—Glenwood Springs, Colo.
Sept. 14-17, 1925

Colorado Public Service Association—

Quarterly Meeting—Glenwood Springs, Colo.
Sept. 14-17, 1925

American Institute of Electrical Engineers—

Pacific Coast Convention—Seattle, Wash.
Sept. 15-17, 1925

Association of Electragists, International—

Annual Convention—West Baden, Ind.
Sept. 23-25, 1925

Electrical Supply Jobbers Association—Pacific Division—

Quarterly Meeting—Hotel Del Monte,
Del Monte, Calif.
Sept. 24-26, 1925.

California Association of Electrical Inspectors—

Semi-Annual Meeting—Fresno, Calif.
Sept. 24-26, 1925.

Puget Sound Company Employees Enjoy Annual Picnic

The annual picnic of the Puget Sound Power & Light Company, Seattle, Wash., held at the company's resort on Lake Tapps, Sunday, Aug. 9, was voted the most successful in the history of the organization by the 2,000 employees, their families and friends who were present.

Under ideal weather conditions, except a slightly smoky atmosphere due to forest fires, the day was devoted to

outdoor sports of every kind—foot-races for men, women and children, novelty races, a nail-driving contest, pole-climbing, and line-throwing, swimming races, boat races, a duck-chasing contest and a variety of other amusements. Dancing was enjoyed in the evening.

The grand prize for the best all-around athlete was awarded to R. M. Boykin, manager of the Seattle division, who not only took second place in the horseshoe throwing tournament but also defeated Captain Norwood W. Brockett, director of public relations, in a special exhibition 50-yard dash. Mr. Boykin made the remarkable time of 3.2 seconds in this event which, those who saw the race confidently believe, would have established a new world record for the distance had it not been for the fact that the official timekeeper used an egg-boiler.

Much of the success of the event was due to the indefatigable efforts of James B. Spellar, chairman of the recreation committee, and to W. B. Donaldson, chairman of the picnic committee.

Supply Jobbers to Hold Quarterly Meeting Sept. 24-26

The quarterly meeting of the Pacific Division of the Electrical Supply Jobbers Association will be held at the Hotel Del Monte, Del Monte, Calif., Sept. 24-26.

This meeting is the first of the new fiscal year and will be an important one, according to Albert H. Elliot, secretary, who requests that reservations be made promptly.

Electrical Inspectors to Meet in Fresno.—The semi-annual meeting of the California Association of Electrical Inspectors will be held in Fresno Sept. 24-26. This meeting will be under the chairmanship of R. W. Abright of Long Beach, who took over the duties of the office Aug. 1. The Electrical Safety Orders of the Industrial Accident Commission and the 1925 National Electrical Code are expected to be in print by that date, and uniform interpretations of these undoubtedly will be discussed by the delegates.

Kelso, Wash., Awards Street Lighting Contract.—The city council of Kelso, Wash., recently awarded contract for ornamental street-lighting system on Main Street to Leon Hampton, Inc., of Longview, Wash.



About 2,000 employees, with their families and friends, enjoyed the annual picnic of the Puget Sound Power & Light Company held at Lake Tapps, Aug. 9, 1925.

Personals

Samuel Kahn, vice-president and general manager of the Western States Gas & Electric Company, Stockton, Calif., and director of the Standard Gas & Electric Company, the holding company of the former, a Bylesby property, in addition to numerous other duties, is



SAMUEL KAHN

president of the Stockton Chamber of Commerce. Mr. Kahn has had a wide experience in the utility field, having been associated during his career with the San Antonio Gas & Electric Company, the San Antonio Traction Company, the Union Light, Heat & Power Company of Fargo, N. D., the Appalachian Power Company of West Virginia and Virginia, and the Tacoma Gas Company, Tacoma, Wash. He joined the Western States Gas & Electric Company in 1913 and has held his present position as vice-president and general manager since that time. He is also vice-president of the Sierra & San Francisco Power Company, another Bylesby property, under lease by the Pacific Gas and Electric Company. Mr. Kahn has always taken an active part in Stockton's civic affairs. He has been a director of the Chamber of Commerce for a number of years and is chairman of its deep waterway committee. He was born in San Antonio, Texas, and graduated from Purdue University in 1903 with the degree of electrical engineer.

J. J. Farley of the Farley Electric Company, Fullerton, Calif., was a recent business visitor to Los Angeles.

L. R. Moran, formerly consulting industrial engineer in Eureka, Calif., recently has become an industrial engineer in Oakland for the Great Western Power Company, with offices at 1700 Broadway. Mr. Moran is a certified member of the American Association of Engineers and also of the American Society of Engineers.

R. G. Gentry and O. A. Weller, both of the Public Service Company of Colorado in Denver, recently attended and took part in the conference conducted by the Y.M.C.A. at Estes Park, Colo., which had as its motif "Christianity in Business."

R. B. Childs of the commercial department and W. H. Ude, director of public relations, The Washington Water Power Company, Spokane, recently spent four days in Wallace, Idaho, and vicinity, visiting important mining companies served by the power company.

H. E. Cook, illuminating engineer for the Edison Lamp Works of San Francisco, resigned Sept. 1 to accept a similar position with the Detroit Edison Company. He will have headquarters in Detroit, Mich.

Ernest P. Kipp, western sales manager of the Hazard Manufacturing Company with headquarters in Denver, recently visited San Francisco.

C. A. Semrad, commercial manager of the Public Service Company of Colorado, G. O. Hodgson, district manager of the Edison Lamp Works, A. E. Bacon, manager of the electrical department of the Mine & Smelter Supply Company, and D. D. Sturgeon, electrager, are members of the special committee appointed to formulate plans for the participation of the Electrical Co-operative League of Denver in the industrial lighting campaign which has been started throughout the United States.

S. E. Gates, manager, General Electric Company, Los Angeles, recently visited Spokane en route from the East. He visited old friends in the electrical industry, Spokane having been his home for many years until his transfer to Los Angeles in 1924.

R. A. Balzari, manager industrial division of the Westinghouse Electric & Manufacturing Company, San Francisco, is making an automobile trip into southern Oregon, after attending the convention of the California Electragists at Eureka.

Arnold Pfau, consulting engineer of the hydraulic department, L. C. Nichols, engineer in charge of transformer design, and L. E. Bogen of the electrical department of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., recently spent some time in California in connection with the electrical developments under way in that state.

G. L. Kollberg, manager of the pumping engine department of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., was a recent San Francisco visitor.

G. W. Cole, formerly heavy-duty equipment specialist with the Utah Power & Light Company, Salt Lake City, recently arrived in San Francisco to take up a similar position with the Edison Electric Appliance Company, Inc.

F. M. Raymond, editor of the National City News, of National City, Calif., and formerly connected with the Arizona Gazette as sports editor, has been given the editorship of the "News-Meter", employee publication of the San Diego Consolidated Gas & Electric Company, to fill the vacancy created by the departure of W. A. Cyr. Supervising editorship of the "News-Meter" will be resumed by R. C. Cavall, superintendent of the record department of the San Diego utility, and original editor of "Glow".

E. J. Cipperly, industrial heating specialist for the Los Angeles office of the General Electric Company, was a recent visitor to San Diego, conferring with H. B. May, San Diego agent for the company.

J. C. Davidson, manager of the electrical department of the Hendrie & Bolthoff Manufacturing & Supply Company in Denver, was a recent West Coast visitor with his family enroute to Alaska.

Robert Miller, manager of the General Electric Company in the Mountain region with headquarters in Denver, has returned from the East where he attended a number of company conferences.

C. E. Magnusson, dean of the College of Engineering, University of Washington, Seattle, has been appointed chairman of the student branches committee of the American Institute of Electrical Engineers.

J. D. Sparks of the Majestic Electric Appliance Company, Seattle, lately visited Spokane in the course of a sales trip which included stops at Butte, Salt Lake City and Boise. Mr. Sparks was formerly with Landers, Frary & Clark of San Francisco.

H. M. Crawford, sales manager of the Pacific Gas and Electric Company, and J. W. Wrenn, assistant sales manager of the Great Western Power Company, San Francisco, explained the combined sales programs of those companies to the electragists at their recent convention at Eureka.

Murray Bourne, associated with the San Joaquin Light & Power Corporation, Fresno, Calif., was a recent visitor in San Francisco.

O. N. Robertson of the Robertson Electric Company, Santa Ana, Calif., was in Los Angeles recently on business.

F. L. Botsford and L. J. Fulcher of the United Commercial Company; J. W. Thompson, Leo J. Meyberg Company, and R. B. Plass, Westinghouse Electric & Manufacturing Company, have recently become members of the San Francisco Electrical Development League.

F. V. Boller, widely known throughout the electrical industry on the Pacific Coast, is now manager of the stock sales department of the San Joaquin Light & Power Corporation, Fresno, Calif., succeeding F. A. Easton.



F. V. BOLLER

Mr. Boller's promotion is recognition of long and efficient service rendered in many different departments of the company. He has been in turn manager of Coalinga, Santa Maria and Madera districts, head of the right-of-way department, and more recently assistant manager of the commercial department.

D. D. Howse of the Electric Products Corporation and H. G. Woodill of the Safety Electric Products Corporation, recently returned to Los Angeles from an extensive trip through Canadian and Eastern cities.

H. B. Jenkins and his son, Harry Jenkins, of the Jenkins Electric Company, Redlands, Calif., made a recent business trip to Los Angeles.

A. M. Fitch of the Harrison-Fitch Electric Company, Pomona, Calif., was in Los Angeles on business recently.

G. I. Farman of the Sierra Madre Electric Company was a recent visitor to Los Angeles.

F. D. Bennett, proprietor of the Radio Equipment Company, Sacramento, was a recent visitor in San Francisco where he attended the Radio Exposition.

W. D. Ryan, illuminating expert, General Electric Company, Schenectady, N. Y., is in San Francisco, where he is in charge of the illumination for the California Diamond Jubilee celebration to be held in San Francisco, Sept. 5-12.

D. E. Harris, newly elected president of the Pacific States Electric Company of San Francisco, was a recent Los Angeles visitor. Accompanied by Frank Airy, manager of the Los Angeles house, he made a business trip to San Diego.

Nathan Levinson, formerly Pacific district radio specialist for the Western Electric Company, recently became head of the radio department for Hale Brothers, San Francisco.

L. M. Klauber, general superintendent of the San Diego Consolidated Gas & Electric Company, recently motored north with his family, stopping on his return at Portland to attend the Pacific Coast Gas Association convention.

W. L. Percey, who recently has been elected vice-president in charge of corporate contracts and documents of the Southern California Edison Company, Los Angeles, is one of the original group of men who make up the executive force of that company. Finding that life as a wholesale dry goods merchant was not to his liking, he left New Jersey in 1896, removed to Los

R. M. Jacks has been appointed sales manager of the Albert Sechrist Manufacturing Company, Denver, Colo.

E. N. Brown, of the Majestic Electric Appliance Company, San Francisco, recently visited Salt Lake City.

G. H. Bucher, assistant general manager, Westinghouse Electric International Company, left New York recently for Seattle, Wash., on his way to Japan where he will assist in the organization of the newly formed Westinghouse Electric Company of Japan. While in the Orient he will visit also China, the Philippine Islands and other Far East countries to make an investigation into the electrical business outlook in those countries.

Frank McGinley of the Harbor Electrical Company, Wilmington, Calif., has been appointed one of the commissioners of the Board of Public Safety and Building for the city of Los Angeles.

J. I. Hill, General Electric Company, Schenectady, N. Y., visited San Francisco recently in the interest of his firm.

H. A. Van Norman, who for the past year has been the Los Angeles city engineer, has been appointed assistant general manager of the Bureau of Water Works and Supply. In this newly created position Mr. Van Norman will carry on the work of the department under the direction of William Mulholland, chief engineer and general manager. It is the intention of Mr. Mulholland to devote his energy almost exclusively to the problems brought up in connection with the attempt to use the Colorado River as a source of water supply for the city of Los Angeles. J. C. Shaw, a member of the board of public utilities and engineering head of the Los Angeles office of McClintic Marshall Company, has been appointed to succeed Mr. Van Norman.

J. M. Evans, formerly city electrician for the city of Modesto, Calif., and more recently assistant electrical engineer for the State Division of Architecture at Sacramento, has been appointed an electrical engineer for the Board of Fire Underwriters of the Pacific. He will have charge of the electrical work for the board in southern California with headquarters in Los Angeles.

G. M. Boyles, KFAE, Pullman, Wash.; R. V. Haller, KGW, Portland, Ore.; Ross Swift, KJR, Seattle, Wash.; E. J. Glade, KSL, Salt Lake City, Utah; G. Allison Phelps, KNX, Hollywood, Calif.; J. G. Daggett, KHJ, Los Angeles; Glenn Rice, KFI, Los Angeles, and C. E. Haymond, KFOA, Seattle, Wash., radio announcers, were among the guests at the luncheon of the San Francisco Electrical Development League held during the recent Radio Exposition.

E. W. Weathers, of San Diego, after a year of private practice as consulting electrical engineer, has reassumed the agency for Howell Red Band motors in San Diego, and gone back into retail business.

W. L. Davis, for many years connected with the stores department of the San Diego Consolidated Gas & Electric Company, resigned recently to accept a position in the newly opened branch office of the Pacific States Electric Company in San Diego.

O. R. Redfern, supervisor of the seventh radio district, with headquarters in Seattle, was one of the speakers at the luncheon of the San Francisco Electrical Development League during the Radio Exposition.

E. C. Magruder, sales specialist for The Meadows Manufacturing Company of Bloomington, Ill., recently arrived in San Francisco to cooperate with jobbers and dealers in their sales plans. He has spent twenty-seven years in the field of electrical appliance merchandising. Mr. Magruder first entered the electrical industry with the Electric Washing Machine Company of Chicago. He later went with the Central Illinois Public Service Company, remaining in its employ for ten years. Prior to becoming affiliated with the Meadows Manufacturing Company, he had considerable ex-



E. C. MAGRUDER

perience with the Empire District Electric Company, a public utility holding of the H. L. Doherty Company in Kansas, Missouri, Oklahoma and Texas. Mr. Magruder travels all over the United States in connection with his work of building up sales plans for jobbers and dealers. His work is primarily that of creating new sales plans and ideas and actively supervising their execution. He expects to remain on the Pacific Coast for the next ninety days and during that time he will work with C. A. Williams, western sales manager for the company, with headquarters in San Francisco.

Albert Casper, general manager of the Vallejo Light & Power Company and Edwin Pierce, manager of the contracting department of that company, were among those present at the Electricists' convention in Eureka.

S. M. Goodwin, formerly an assistant secretary of the Interior, has resigned to become the representative in Washington of the Columbia Basin Irrigation League.

Obituary

A. M. Poindexter, head of the Poindexter Electrical Supply Company, Denver jobbing house, died Aug. 12 after an illness of several weeks. Mr. Poindexter was world-famous as a marksman, at one time having been named the best pistol shot in the United States. He was active in the civic development of the community in which he resided. He formerly served as a member of the advisory board of the Electrical Cooperative League in Denver.



W. L. PERCEY

Angeles and joined the West Side Lighting Company, one of the predecessor companies of the present Edison company. Beginning as cashier, he worked up through the ranks until in 1906 he was made treasurer of the company, and has held that position up to the present time.

TRADE NOTES

The Diamond Flasher Button Company has been organized in San Francisco for the manufacture of a new flasher for electric signs. The new device is exceedingly simple. It is of the diameter of a standard lamp socket and $\frac{1}{4}$ in. thick. It fits into the lamp socket beneath the lamp and operates on a thermostatic principle, turning the current on and off. It is designed for two speeds, sign flashing or a beacon light. The flasher is being distributed by the Associated Distributors, Inc., 639 Mission Street, San Francisco, and 314 Omar Street, Los Angeles.

Century Electric Company, St. Louis, Mo., has issued recently bulletin No. 38, which describes and illustrates its squirrel-cage induction polyphase motors.

Pass & Seymour, Inc., Syracuse, N. Y., has placed on the market a special new device for use in wiring old houses where loom boxes and the BX type of surface boxes are used frequently.

The Miller Company, Meriden, Conn., has added recently seventeen new fixtures to its fixture line. They are of the semi-Georgian design with many new improvements. The company also is introducing a new line of safety holders for commercial units. The new line includes ceiling and suspension fixtures in the plain and ornamental designs.

Acme Wire Company, New Haven, Conn., has completed a new catalog of its products containing full information on magnet wire, special insulated wires, coil windings and varnished insulating materials.

Delta-Star Electric Company, Chicago, has issued bulletin No. 12 describing its new line of standardized steel-tower outdoor substations intended for installation by utilities serving or customers buying power from high-tension distribution lines.

Electro-Vapor System Supply Company, Seattle, Wash., has secured the exclusive rights from the Electro-Vaporific System of Royal Oak, Mich., for the manufacture, sale and distribution of its products in the states of Oregon and Washington, and is preparing to place the electric-steam radiator and water-heater on the market.

The Hisey-Wolf Machine Company, Cincinnati, Ohio, has added a new "Hisey" heavy-duty grinder to its line of electric machines. The machine is illustrated and described in its new bulletin which will be mailed to the trade on request.

Chicago Fuse Manufacturing Company, Chicago, has placed on the market recently new gem sectional switch boxes with lath support and mounting bracket that save installation time. Many other features are embodied in this new installation it is claimed.

Coldwell Lawn Mower Company, Newburgh, N. Y., is issuing literature describing and illustrating the merits of its new product, the Coldwell electric lawn mower, which recently was completed after more than two years of development work and careful tests. The mower will be ready for the trade about the first of the year.

The Penn Lite Supply Company, specializing in lighting fixtures and fixture parts, both wholesale and retail, has been established in Denver at 14th and Glenarm Streets.

Arrow Electric Company, Hartford, Conn., has introduced a new fixture device known as the tumbler-type candle socket, which is described and illustrated in its new circular.

Holophane Glass Company, Inc., New York City, has issued recently a new booklet entitled "Streets That Are Safe," that has been prepared for distribution among municipal authorities and citizens who are interested in better street lighting.

Edison Electric Appliance Company, Inc., Chicago, has added several new numbers to its line recently, among them being a triplex grill under catalog No. G10; a Hotpoint traveling iron, No. 114F22; a Hotpoint toaster, No. T18 and a new model automatic range under catalog No. RA73.



R. M. Boykin (left) manager of the central district of the Puget Sound Power & Light Company outdistanced Captain Norwood W. Brockett (right), director of public relations, in a 50-yard foot race at the company's annual outing held recently at Lake Tapps. Mr. Boykin's dash was made in 3.2 seconds, according to the time-keeper's official stop-watch, an egg-boiler.

Norman-Hoffmann Bearings Corporation, Stamford, Conn., has issued recently two new catalogs, "Hoffmann" describing its precision roller bearings for heavy loads and hard service, and "Norma," which describes its precision ball bearings, open and closed types. Both catalogs are well illustrated.

The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has purchased the business and patents of Payne Dean, Ltd. The Cutler-Hammer Manufacturing Company has manufactured the Dean valve-control apparatus and other equipment in the past, and it will continue the development and manufacture of these devices and also will market them.

Utica Products, Inc., Utica, N. Y., is the name of the former Xardell Company. The new firm, which was incorporated recently, will handle the Utica portable electric furnaces and other appliances.

General Electric Company, Schenectady, N. Y., has issued bulletin GEA-82, giving a history of the automatic stations, a general description of the apparatus, proofs of the economy of operation, scheme of operation, supervisory control, plans for apparatus arrangement and a list of typical railway installations.

The Engineering Corporation, Long Beach, Calif., has developed an electrical recording smoke-detector to be attached to boilers that it is claimed will give the boiler operator immediate warning of any tendency of his furnace to cause smoke.

Sangamo Electric Company, Springfield, Ill., has developed a new lower bearing construction for its type D-5 direct current watt-hour meters, which it is claimed has many advantages over the old type.

The Serval Corporation, 17 East 42d Street, New York, recently has announced the purchase of a 50 per cent interest in its business by a group of well known electric light and power executives. The company will be operated under the direction of H. G. Scott, who has resigned as vice-president of the Columbia Gas & Electric Company of Charleston, W. Va., to become chairman of the board and executive committee.

The White Lighting Fixture Studio is the name of the lighting fixture and supplies firm formerly conducted by P. B. Lockwood and A. White at 711 Mission Street, San Francisco. Mr. White has taken over the business and has established headquarters at 94 Golden Gate Avenue.

Allen-Pursel Electric Company, a recently opened electrical store at 1225 North Vine Street, Hollywood, Calif., will specialize in merchandising electrical appliances and equipment, with a separate radio department. E. L. Allen and H. W. Pursel, the owners, were formerly with the sales department of the Hollywood Electric Company.

Circle F Manufacturing Company, Trenton, N. J., has issued a circular descriptive of its security lock-type electrolier socket for fixture and lamp use that has been added to its stock of brass shell sockets. The company also has placed on the market a ceiling light receptacle of new design that is to take the place of Nos. 218, 218-S and 219-S. A new rigid bracket socket, known as No. 1218, also has been added to the line.

Maydwell & Hartzell, San Francisco, have been appointed factory distributors for Smith & Hemenway Company, Inc., Irvington, N. J., manufacturers of "Red Devil" tools, a complete line for the electrical, automotive, hardware and radio trade.

The Charles A. Etam Company, formerly located at 3804 Third Avenue, has moved into its new store at 3733 S. Western Avenue, Los Angeles. The firm is operating as manufacturers' representatives and distributors of several Eastern manufacturers of radio and electrical equipment.

Hynes & Cox Electric Corporation, Albany, N. Y., has issued a new circular describing and illustrating its electric glue pot.

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES



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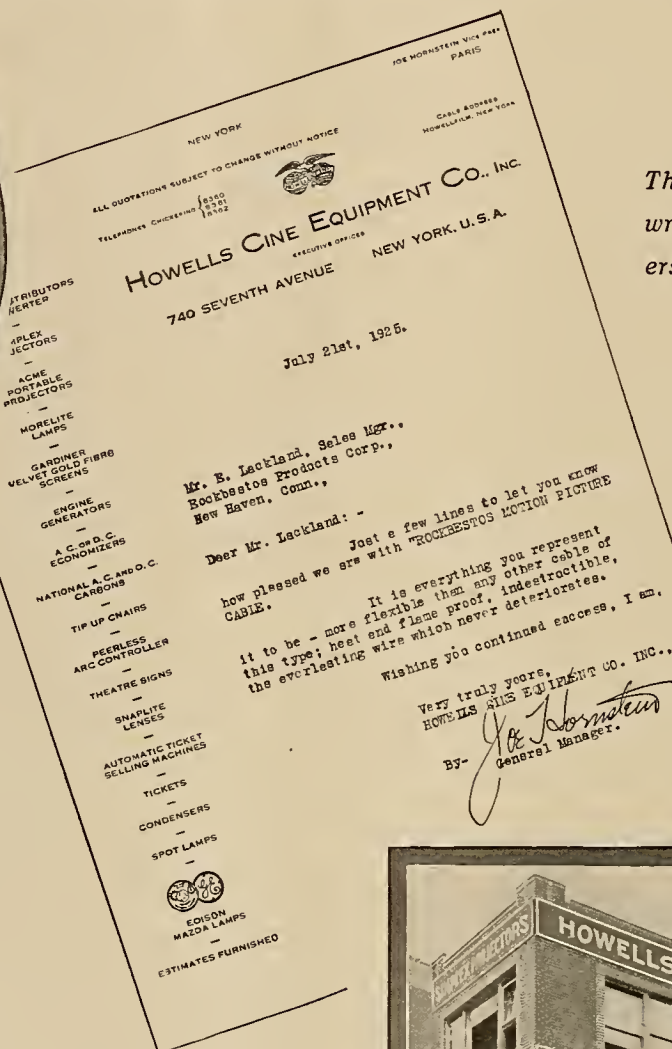
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IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

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R. N. PHELAN, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

W. A. CYR, Associate Editor
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VOLUME 55

SAN FRANCISCO, SEPTEMBER 15, 1925

NUMBER 6

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McGRAW-HILL COMPANY OF CALIFORNIA — 883 Mission St. — SAN FRANCISCO

Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

JAMES H. MCGRAW
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WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Teoth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

Copyright, 1925
By McGraw-Hill Company of California

Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

Oct. 1 Issue Will Contain Reports of Two Important Conventions

THE forthcoming Oct. 1 issue of the Journal will be of more than passing interest. Two events of considerable importance to the electrical industry in the West will have taken place: namely, the annual meeting of the Rocky Mountain Division of the National Electric Light Association at Glenwood Springs, Colo., and at Seattle, Wash., the Pacific Coast convention of the American Institute of Electrical Engineers.

Advance copies of the programs indicate that matters under discussion at these two meetings will add materially to the story of progress of the electrical industry.

In order that its readers may have the advantage of first-hand information as to what takes place at these two meetings the publishers of the Journal of Electricity have arranged to have George C. Tenney, managing editor of the Journal, attend and report the Glenwood Springs conference, while G. R. Henninger, associate editor, will perform the same function at the sessions of the American Institute of Electrical Engineers. Thus through this service those who are unable to attend the conventions may see everything that happened through the eyes of trained observers, while those who do attend live over again the events in which they took part.

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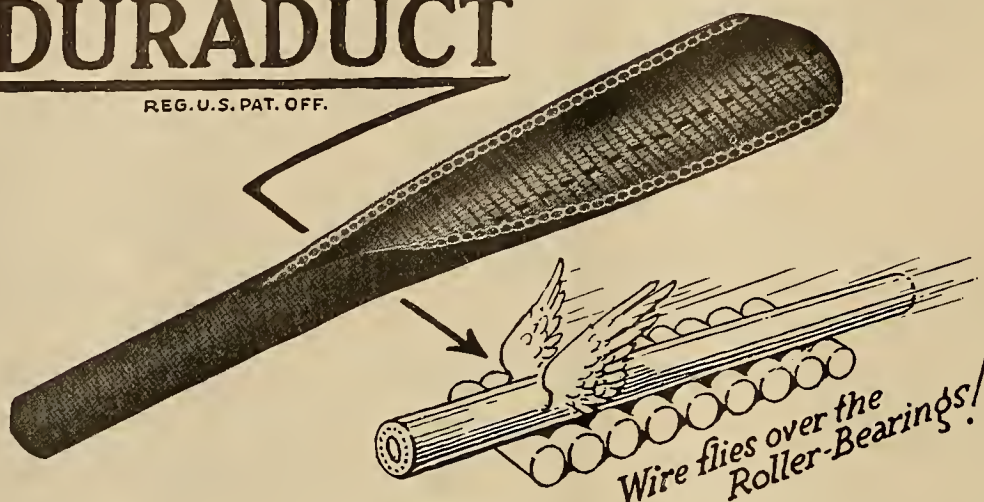
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EDITORIAL

Arizona Once More Blocks Progress on the Colorado River Problem

ONCE again efforts to settle amicably the differences relative to the utilization of the resources of the Colorado River have been upset by Arizona. A tri-state conference between representatives of California, Nevada and Arizona, meeting in Phoenix Aug. 17, 1925, adjourned after less than a day's deliberations when the position of Arizona was presented by Governor Hunt. On another page of this issue is the governor's pronouncement of the stand of the state whose arbitrary attitude has proved a stumbling block whenever any attempt has been made to arrive at a settlement of the rights of the Colorado River basin states to the water and power resources of the stream.

Governor Hunt begins by attacking the terms of the Colorado River compact that was ratified by six states but opposed by Arizona. He cites as errors in the compact that it does not apportion the waters between states but between basins; that the upper basin states would receive more than their just share of the water; that no provisions have been made to prevent water stored in the United States from being utilized in Mexico. Under the terms of the compact he charges that the upper basin states and California will achieve wealth, economic security and the assurance of the continuance of these benefits, while Arizona and Nevada will receive nothing. In one breath he says that Arizona does not know what she wants from the Colorado River and in the next that the state reserves the right to derive revenue from power developed on the stream within its borders and utilized in other states. A careful study of his address will reveal other equally startling statements.

We are inclined to believe that the pronouncements made by Governor Hunt do not represent the true sentiment of the people of Arizona. We remember that each time an endeavor has been made to reach an agreement on the Colorado River problem it has been the man in the gubernatorial chair who has been responsible for its failure. Surely there is a citizen among the broadminded and progressive business men of the state with sufficient interest in its affairs to accept the gubernatorial nomination in opposition to the incumbent. A governor will be elected in 1926. Let us hope that a candidate will be elected who will recognize that an early settlement of the Colorado River problem will mean much for the future of Arizona.

Electric Range Is Out of Specialty Class

CONSIDER the little snowball—a slight push starts it rolling and in a short while it is a thing of great size and mighty import. The same thought applies to the merchandising activities of the California central stations. In the few weeks since the announcement of the load-building campaigns of the power companies of that state the industry slowly has been awakening to the importance of these sales drives. The greater activity is being displayed by the so-called non-electrical outlets. Keen merchants such as furniture dealers, department stores and household furnishing goods stores rapidly are realizing the dollars and cents value of the advertising and sales work which the central stations are doing. This realization is reflected in the amount of electrical appliance advertising appearing in the daily newspapers. Full-page advertisements for electric ranges over the signature of a furniture dealer have been a rarity in the past, but in several California cities they have made their appearance during the last fortnight. As was the case with the iron, the vacuum cleaner and the washing machine, merchants have realized that the electric range, a specialty yesterday, has become a standard commodity almost over night due in large measure to the intensive pioneering work of the central stations.

Sell Appliances Like Bathrooms— A Complete Job Included in Mortgage

A CHALLENGE to the electrical industry in the sale of appliances is made in an editorial in the current issue of "Electrical Merchandising". There is much food for thought in the statement that the industry is lagging far behind the growth of the household market and that more homes are being wired each year than are being equipped adequately with appliances. A better, faster way must be found of selling appliances to the public. And the answer, according to the editorial, is to pattern the efforts of the industry after the plan used by the bathroom salesman—sell a complete electrical installation with the heavy appliances inclusive under the mortgage. More specifically the plan outlined is:

"1. Let us sell not just single appliances, but complete equipment. Let us prove the practical and personal advantages of meeting present conditions of cost and labor in the home, by doing the housework electrically.

"2. Let us show each household how the mort-

gage money can be made to pay for the heavy equipment—clothes-washer, ironer, dish-washer, kitchen motor, refrigerator, and where the rate permits—a range and water-heater—if these are screwed fast and permanently installed when the house is built or bought.

"3. Let us also figure for the customer how to make the regular household budget pay for the auxiliary equipment—the vacuum cleaner, sewing machine, fan, toaster, percolator, waffle iron, heat pad and the rest,—by setting up an easy-payment contract and a regular schedule of appliances, with a fixed appropriation of so much a month."

Courageous selling and a greater realization of the household market are the things which will sell complete electrical equipment—a \$1,500 order for each home.

Denver Cooperative League Begins Fifth Year with Bright Prospects

DENVER'S electrical industry may be justly proud of the four-year record of its Electrical Cooperative League. This service organization, one of the half-dozen pioneers in the field, has passed its fourth milestone and is entering upon its fifth year with bright prospects for even greater success than it has met in the past.

Electrical men in cities where other cooperative organizations are functioning and those in districts which should support such leagues, but which do not do so will benefit from a careful study of the fourth annual report of the Denver League that has just been issued. In its effort to place the electrical industry, including its utilities, before the public in such a manner as to inspire understanding, confidence and good will, the league has learned from experience the advisability of development along certain definite lines. The code which it has established in the light of its past experience includes the following:

1. Serving the public as a bureau of electrical information—a consulting service without charge.
2. The maintenance of a staff to work directly with architects, builders, owners, and others in advising on electrical installations in all types of buildings.
3. To work toward the continual improvement and enforcement of electric wiring rules.
4. To explain, demonstrate and emphasize the necessity and value of proper lighting.
5. The encouragement and co-ordination of electrical exhibits.
6. The establishment of electric homes in the most advantageous places.
7. The development of teamwork throughout the industry by get-together meetings and other social activities.
8. The establishment of a consciousness in the mind of every electrical man in the community that he cannot be an ardent electrical advocate until he himself practices the precepts of the industry.

9. The extension of membership in the league to other interests participating in the benefits of its work, including such other territory outside of Denver as can be served profitably.

10. The education of the consumer to the value of the league and the whole-hearted willingness and ability of the industry which it represents.

With such a code to guide its operations and with the electrical industry and the public cooperating harmoniously, there cannot help but be engendered a spirit of service in the Denver electrical industry and a full realization that even more progress can be attained in future years.

Electric Appliances

Bring Longevity to Women

THE world at large, and especially the feminine portion of it, is busily engaged in the quest of perpetual youth. The mythical Fountain of Youth with which Ponce de Leon regaled the effete hangers-on of European court circles some centuries ago finds its counterpart in the many nostrums of one kind or another advertised in publications of general circulation.

"How to be young, though old," is the question that will be asked eagerly, pathetically, as long as the human race endures. The psychopath talks learnedly about "complexes", the diagnostician descants upon the mysteries of high blood pressure, arteriosclerosis, ductless glands and other mysterious human ailments, and all to no purpose whatever unless we can find a way to prevent the waste and destruction of our tissues and arterial system before their time.

It is the ounce of prevention that counts. The work of General Leonard Wood in Cuba and that of General Gorgas in the Canal Zone in preventing the germination of disease-bearing bacilli did more for humanity in a short time, and did it more effectively, than a whole list of alleged cures.

All of this is a greater argument for the electric servant than all of the rest of them put together. Who cares whether a candle costs less than an incandescent lamp? What boots it whether a coal fire in a range costs less than electrical energy for cooking? Shall we ask our wives to bend over a wash tub as our grandmothers used to? We hope not.

Here's to the electrical servant, that does our work efficiently, cheaply, cleanly, while we and our wives partake of the joys of life in a measure hitherto impossible. Abraham Lincoln's mother died at thirty-five. That was before the days of the electrical servant.

Sell Refrigeration

Not the Refrigerant

SULPHUR Dioxide—a colorless gas, SO_2 , having a pungent suffocating odor, produced by the burning of sulphur, etc. It is used in making sulphuric acid, as a bleaching agent, as a disinfectant and anti-septic, etc.

Methyl Chloride—a colorless sweet smelling gas, CH_3Cl , obtained by action of hydrochloric acid on

methyl alcohol. It is easily liquefied by cold or pressure and is used as a refrigerant and local anesthetic.

Thus are defined in Webster's New International Dictionary two of the gases used in the domestic refrigeration process. Examination of the report of the Electric Refrigeration Committee of the Commercial Section of the N.E.L.A. for 1924-5 reveals that other gases used as refrigerants in domestic machines are ammonia, ethyl chloride, butane and isobutane, and the definitions of these others would sound as innocent as the above and be as lacking in human interest.

Shorn of embellishment, stripped of any hint of passion or prejudice, colorless as the gases they describe, these bare facts do not contain eloquence to fire the imagination or stir the soul. But what a debate could be staged by the champions of any of these gases on the relative merits as refrigerants! With what fervor could each contender for commercial prestige extol the properties of the gas used in the machine he sells, and with what rancor could he attribute dire properties to the gases used by his competitors! And yet all these gases have proved efficient; all are safely handled.

Let us enter a plea for a broadminded selling policy among refrigerator competitors. The old platitude, "Every knock is a boost," as applied to selling a competitive article, is a fairly well established axiom and might act as a deterrent when the temptation is strong to knock the other fellow's machine. But let us go further and point out that every seed of fear of any of the commonly used refrigerants sown in the mind of a prospect may ripen into a distrust of all refrigerants, thus setting up a sales resistance to all refrigeration machines. In the interest of volume of sales, which will benefit the entire electrical industry, let us reiterate the plea that **refrigeration** be sold—not the refrigerant.

Make Service, Not Price, the Basis of Wiring Jobs

IT is interesting to observe the unanimity with which the foremost students of selling and selling methods condemn the emphasizing of the "price" basis as of paramount importance in selling goods. Some years ago a man who achieved success as a merchant said: "There are but two kinds of competition, price and service". Price competition there always will be, but modern thought has brought about a "soft-pedaling" of price, with the service idea as a major theme.

Observers of modern advertising copy will note a conspicuous absence of published prices. "Tell what it will do for the purchaser and how well it will be done," is the present-day theme, while the price question is left as the last item to be considered.

An automobile costs more than a bicycle; a horse and buggy furnish transportation of a sort; an oil lamp will give light, to be sure, but—what has become of them all? Certainly nothing short of sheer stupidity can be the excuse for offering goods of any kind with nothing in their favor but what appears to be a low price.

The electrical contractor who rushes to the architect or owner with a set of wiring plans to tell him how he can "save" so much money by leaving out this or that is simply standing in his own light, as well as that of the house-owner, who will find a material stumbling block in his way when he wants to enjoy in fullest measure the benefits of electrical service, and the entire industry suffers as well.

In his work the electrical contractor of vision recognizes both an obligation and an opportunity—an obligation to do a first-class job with resultant satisfaction to the customer; an opportunity to build for his own future.

A good suit of clothes is cheap. A low-priced suit of shoddy is dear. An adequate wiring job with a sufficiency of outlets is cheap in terms of service, comfort and satisfaction to all concerned. Don't talk price; talk service.

DISCUSSION

Official Gives Status of Logan Municipal Electric Plant

To the Editor:

Sir:—I have read with some interest an account pertaining to the municipal electric plant at Logan City, Utah, as published in the Journal issue of Aug. 15, 1925. This was a movement set on foot by a few citizens to dispose of the plant and the report a brief of which you published, is but the first chapter of this interesting subject.

After the report of the special committee was reviewed by a majority of the chamber's board of directors, a meeting of the entire Chamber of Commerce was called on Aug. 6, at which time the electric light matter was considered and discussed at considerable length and it was finally decided by a vote of 83 to 45 to rescind the action of the board of directors and reject the report. In the discussion of this question it was brought out that there was considerable prejudice against the plant written into the report. Ways and means were discussed looking to supplying the municipal plant with auxiliary power in times of water shortage and accident.

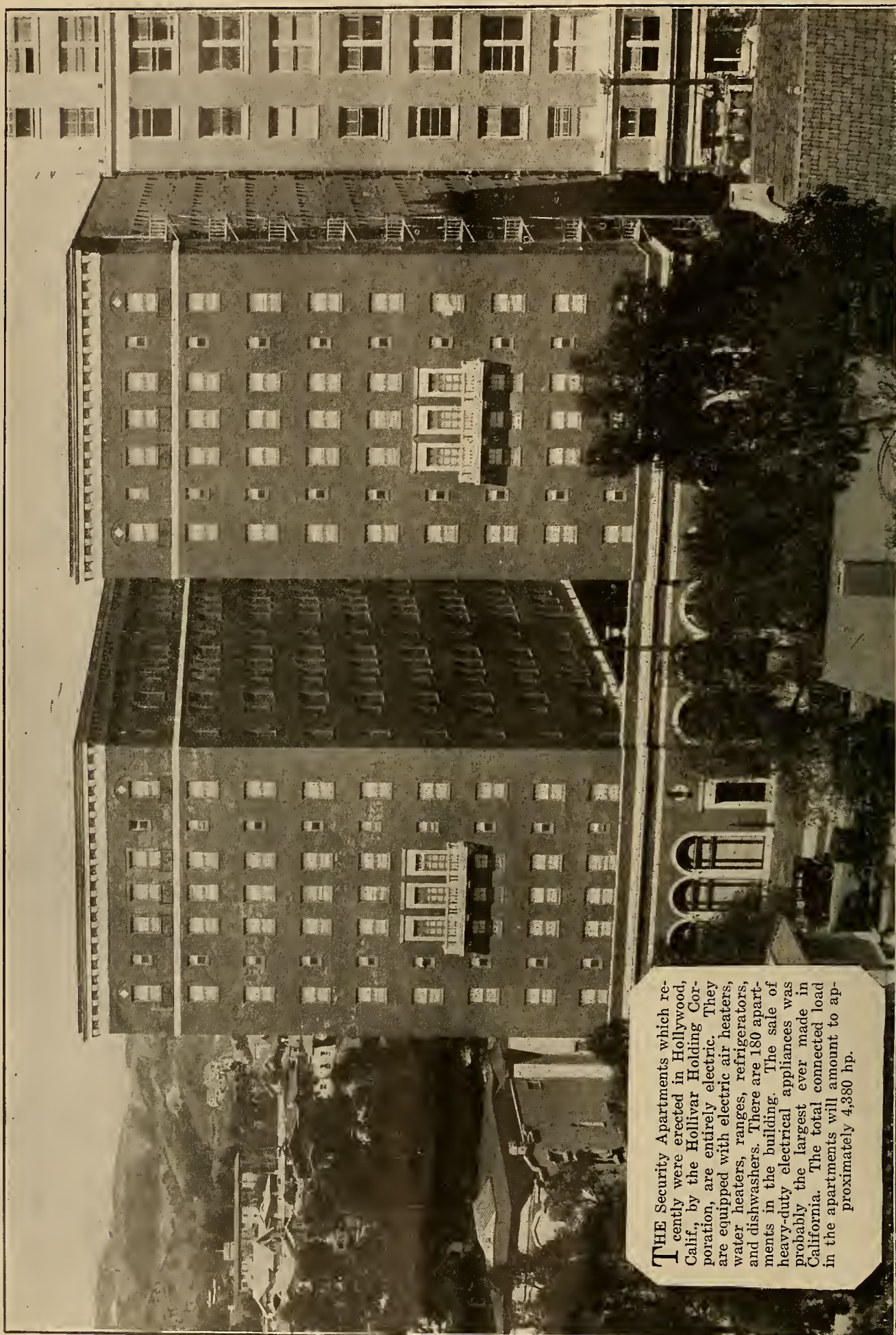
On Aug. 28 an enthusiastic meeting was held at which over two hundred taxpayers were present, and organized a "Logan City Welfare Association," committed to the proposition of protecting Logan City and its interests, and especially the electric light plant, hoping to set at rest once and forever this idea of selling to public utilities.

This, Mr. Editor, is the second and last chapter of our little story, and trust you will give it space so that the industry might know that Logan, Utah, stands 85 per cent strong for her municipal plant.

LOGAN CITY CORPORATION,

Logan, Utah,
Aug. 31, 1925.

H. C. MAUGHAN,
Supt. Electric Light Plant



THE Security Apartments which recently were erected in Hollywood, Calif., by the Hollivar Holding Corporation, are entirely electric. They are equipped with electric air heaters, water heaters, ranges, refrigerators, and dishwashers. There are 180 apartments in the building. The sale of heavy-duty electrical appliances was probably the largest ever made in California. The total connected load in the apartments will amount to approximately 4,380 hp.

Arizona's Viewpoint on the Colorado River

By George W. P. Hunt*
Governor of the State of Arizona

THIS conference has been called in an endeavor to find a remedy for and to reconcile some of the defects contained in the Colorado River compact, which was negotiated at Santa Fe, N. M. This compact purports to allocate the waters of the Colorado River in accordance with the terms of a uniform law passed by Congress and the seven states in the Colorado River basin. By referring to the law you will ascertain the fact that it authorizes a compact apportioning the water of the Colorado River "between the states."

The first fundamental error in the compact is that it does not apportion the water as authorized by law "between the states," but between arbitrary divisions called basins, the "upper" and the "lower" basins, and this was done without consideration of conditions existing in the two arbitrary basins created. Under the arbitrary conditions established for the divisions of the water, Arizona, due to economic conditions, is subject to the same difficulties as the upper basin states and by signing the compact would, in competition with California, be signing away all her rights and hopes for future development.

The second fundamental error in the compact is that all of the water that the upper basin states can ever use (and some eminent engineers claim more water than they can ever use) has been apportioned to them, while insufficient water was allocated to the lower basin to irrigate all of the lands susceptible to feasible development and in return for this advantage in allocation of water they give nothing to the lower basin either in recognition of rights, of storage facilities or otherwise, unless we except possible freedom from legislative and departmental coercion and threatened law suits.

The third defect in the compact is that no provision is made to prevent water stored in the United States, when it is released and the low water flow increased, from being applied to Mexican lands and possible water rights acquired in that country.

The fourth defect is that in the allocation of water the upper basin states will be served from the normal flow of the river, while the lower basin must depend on storage, and no allowance is made for

ON Aug. 17, 1925 a meeting was held in Phoenix between representatives of California, Nevada and Arizona in an effort to arrive at some settlement regarding the development of the Colorado River. The meeting was adjourned following the pronouncement of Arizona's stand on the question by Governor Hunt. The governor's statements are presented herewith.

evaporation losses which will result to the lower basin from the stored water.

Other defects exist which I shall touch on later.

What is the reason for any compact being negotiated which sets aside the present well established and defined water laws which govern the utilization of water in all of the states of the basin and the principles of which were held by the United States Supreme Court to govern as between

the states in the basin? The only answer that can be made logically and truthfully is that it is dictated by the farsighted business acumen of some of the states in the basin which are endeavoring to secure for use, in the distant future, rights which they do not now possess under the law. The upper basin states are manifesting no altruism in demanding a compact. They do not take the position that it is immaterial where development is undertaken so long as it is in the United States. They are demanding all that they can get for their political subdivisions or states. Why should we not do likewise?

Economic law may be harsh, but it is the only law that governs. We are told by eminent authorities that \$150,000,000 in unearned increment will become attached to the lands of the Imperial Valley as soon as adequate storage facilities are provided to insure a steady supply of water for irrigation and flood control; and that additional hundreds of millions or perhaps billions of value in unearned increment will accrue to southern California municipalities and lands when an abundance of electrical energy is made available. Thus, under the terms of the Colorado River compact, the four upper basin states and California achieve wealth, economic security and the assurance of the continuation of these benefits in perpetuity.

What of Arizona and Nevada, the remaining two states in the basin? We are told, quoting ex-Governor Boyle, that Nevada can possibly utilize 10,000 hp. from the Colorado River at this time; that they may eventually utilize 100,000 hp. and that they may irrigate not to exceed 80,000 acres of land. Mr. Weymouth and Mr. Davis, former chief engineers of the United States Bureau of Reclamation, state 3,000 and 4,000, respectively.

*Excerpts from a speech before the Tri-State Colorado River Conference, Phoenix, Ariz., Aug. 17, 1925.

You ask about Arizona? What does she want from the Colorado River? I say, frankly, that at this time all we ask for, if the economic laws are to be set aside and a treaty negotiated, is that Arizona receive protection of her rights, including her future development. If you ask me specifically what we want, I reply to you frankly, without any apology, that we do not know, because we have not sufficient data available to determine what it is practical to develop.

Arizona is in the position, if the present water law remains undisturbed and unimpaired, of asking nothing. We are fully satisfied with the present laws as interpreted by the United States Supreme Court. We are fully able, under present laws, to protect our interests from all of the other six states in the basin and from Mexico. We do not fear development in California or in the upper basin if the law of priorities, based upon appropriation for beneficial use, remains in full effect. But if that law is to be disturbed, modified or set aside, we have immediate cause for alarm. The proposal to set the law aside does not come from us.

We had not been particularly interested in the immediate development of the Colorado River up to the time the compact was discussed. It is only thirteen years ago since we obtained statehood. We have been developing our resources within the interior of this state. We think we have made tremendous strides since 1912, considering our small population and taxable wealth in that our percentage of increase in population exceeded that of any other state in the Union during that period. We were satisfied to permit the Colorado River to remain a potential asset until we were ready to utilize the same.

I have said that we do not know in detail what Arizona wants from the Colorado River. We do not know because we have very few facts. Under the Kincaid Act, passed by Congress, the United States spent over \$2,000,000 in the vicinity of Boulder Canyon and practically none elsewhere on the river. There is some testimony that the Imperial Valley irrigation district has spent half a million dollars in connection with the proposed Boulder Canyon project, and we have no information as to how much money southern California municipalities and the state of Nevada and other interests have spent in this connection. The lack of information and data in regard to any other portion of the river, other than that at Boulder Canyon, is very succinctly stated by Col. William Kelley, chief engineer of the United States Federal Power Commission, as follows:

"The need for more facts is the rather astounding conclusion one must reach from study of the data at hand. While hundreds of thousands of dollars have been expended on intensive investigation at Boulder and Black Canyons, the various dam sites between Boulder and Diamond Creek are untested, as is also the site at Mohave Canyon. Drilling at these sites and sufficient investigation and study to permit estimates of comparable accuracy to be made for each are necessary before a satisfactory conclusion can be reached."

When the Colorado River compact was negotiated the representatives of the state of Arizona had no

material facts as to the possibilities of development in this state, unless the information as contained in the report of Mr. Arthur P. Davis is to be accepted by Arizona as accurate—something we are not willing to accept.

The question may be raised that it is not the fault of the other states that Arizona is not in possession of the facts. Our reply is that Arizona is not asking that the law of priorities based upon appropriation for beneficial use be set aside. Arizona is fully content with that law. We think it is fair, equitable and just. Under the provisions of that law there has been no need for Arizona to be in any hurry about spending money for Colorado River surveys or to fear early development of the Colorado River from any other source, as we spent our money elsewhere where there was more need of it.

Since the Colorado River compact was negotiated, engineers tell us that it is possible to develop additionally from 700,000 to 3,000,000 acres of land in Arizona from the Colorado River. Other engineers accept the data of Mr. Arthur P. Davis which states that it is only practicable to irrigate some 280,000 acres of land, which includes the Yuma project in Arizona, from the Colorado River. We think we have secured sufficient information in the past two years to justify the belief that a considerably greater area in this state can be irrigated from the Colorado River, and we want the water to do it, if further surveys prove it practicable.

In negotiating a treaty concerning the Colorado River we do not see our way clear to allocate, by treaty, any of the waters from Arizona streams as a portion of the main Colorado River. We insist that the laws of Arizona shall govern on the basis of prior appropriation for beneficial use and remain undisturbed on Arizona streams. We grant the same right to Nevada and to California to utilize the waters of all of the streams that originate in their territory, but we decline to dispose of, to other states, by treaty, rights in Arizona streams that can be acquired in no other way. Economic law and self-preservation dictate our policy in this matter.

I think I appreciate fully that you gentlemen did not come to Arizona looking for charity. If Arizona signed the Colorado River compact in its present form we would be signing away our future rights to utilize the resources of the river without recompense. If we have something you want and can utilize, economic justice dictates that it be paid for. I believe Arizona and Nevada have a definite interest in the Colorado River that received no consideration in the compact and little consideration in the discussion concerning it; and that is the right to derive revenue from the power developed by the harnessing of the river within our borders.

I am not fully informed as to how Nevada feels about the matter, but the state of Arizona expects to derive revenue from every unit of electrical energy generated in this state that is utilized in other states. The Colorado River compact does not deal with this question, but the state engineer of California, in a communication addressed to the governor of California, states that the upper basin states have some claim on power that may be developed

in the lower basin. I deny that any such right exists. I repudiate such doctrine. The Colorado River compact gives to the upper basin states rights which they cannot acquire under the law except by putting the water to beneficial use before it is utilized in the lower basin. What do they give in return? Whether the water be apportioned under existing law, or by treaty, when it comes to the Arizona line the upper basin states have lost all title and right to it, and Arizona will conclude no treaty unless that right be fully recognized and established.

Something has been said from time to time about the nationalization of the river; that Arizona is said to have forfeited her rights under the terms of the Enabling Act granting statehood to this state. Efforts have been made to distort the law as it relates to navigation, and alleged rights the federal government might have in a navigable river are used as a basis for discussing nationalization of the river. In this connection I say to you that so long as the courts of this land remain open Arizona anticipates no menace from that direction. We would expect to get from the courts the same rights that New York might.

Arizona asserts that she is a sovereign state with rights equal to those of any other state; that she has jurisdiction over the bed of the streams from high water mark to high water mark within this state and all of the water that flows therein except as title has been acquired under existing law, and that between the states of Nevada and California, where the stream is a border stream the sovereign rights lay between those two states and Arizona and that any rights as to power sites that the federal government may have in the streams are the rights of a proprietor only.

I hope that some day that usurped right of the United States will be challenged and that Arizona may have the opportunity to show in the Supreme Court that when the Congress of the United States made the reservations as to power sites it exceeded its authority in denying admittance of the territory of Arizona to the union of the states, which comprise the United States, on an equal basis with all of the other states.

Arizona asserts that while the federal government, as a proprietor, may own the lands abutting the dam sites and the lands that will be overflowed, the state of Arizona, as a sovereign, owns the land in the bed of the stream upon which the dam will be erected and the water in the stream, and that it reserves the right to tax and derive revenue from

any development in the river in whatever manner the law of this state may devise.

In conclusion I believe that any decisions you may reach should first of all stipulate that no treaty allocating the waters of the Colorado River shall be effective until it is fully established between the United States government and the Mexican government that no water rights will accrue to Mexican lands resulting from any storage facilities provided on the Colorado River or any of its tributaries. Second, I believe that all the water that may remain unappropriated for beneficial use, under the terms of the Colorado River compact, by the upper basin, should be the basis of apportionment in the lower basin rather than that the allocation be limited to eight and one-half million acre-feet appropriated by the compact.

At this time Arizona is asked to negotiate and distribute resources from the biggest asset she has because some other sections of the country assert that the immediate development of this asset is imperative to their welfare. We are unprepared to negotiate, but if an adjudication can be worked out that sounds anywhere near fair and equitable to this state I shall be very glad of the same. I stand ready to cooperate with you and to make available any information we possess. I trust that your labors may prove successful.

Comparison Shows Steady Decrease in Price of Electricity

The high cost of living continues to be a favorite topic for discussion, complaint and speculation. Article after article is cited to show the steadily mounting trend. There is one commodity, however, whose cost not only has not joined the upward march but, in comparison with other items, actually has decreased. That commodity is electricity.

The accompanying table, prepared by the Bureau of Labor Statistics and based on a summarization of figures on the increase in the cost of living in thirty-two cities in the United States from 1913 to June, 1925, computed on a 1913 base, shows that while living costs mounted steadily until they reached an increase peak in 1919 and 1920 of 99.3 per cent and 100.4 per cent, respectively, the price of electricity for the same period decreased, the figures for those two years being 7.4 per cent and 4.9 per cent, respectively. Since that time it has decreased in the following percentages: 4.9, 7.4, 8.6, 8.6 and 9.9.

CHANGES IN COST OF LIVING IN THE UNITED STATES, 1913 TO JUNE, 1925

Item of Expenditure	Per cent of increase from 1913 (average) to—										
	Dec. 1914	Dec. 1915	Dec. 1916	Dec. 1917	Dec. 1918	Dec. 1919	Dec. 1920	Dec. 1921	Dec. 1922	Dec. 1923	June 1925
Food.....	5.0	5.0	26.0	57.0	87.0	97.0	78.0	49.9	46.6	50.3	55.0
Clothing.....	1.0	4.7	20.0	49.1	105.3	168.7	158.5	84.4	71.5	76.3	70.6
Housing.....		1.5	2.3	.1	9.2	25.3	51.1	61.4	61.9	66.5	67.4
Fuel and Light.....	1.0	1.0	8.4	24.1	47.9	56.8	94.9	81.7	86.4	84.0	76.7
House-furnishing goods.....	4.0	10.6	27.8	50.6	113.6	163.5	185.4	118.0	108.2	122.4	114.3
Miscellaneous.....	3.0	7.4	13.3	40.5	65.8	90.2	108.2	106.8	100.5	101.7	102.7
All items.....	3.0	5.1	18.3	42.4	74.4	99.3	100.4	74.3	69.5	73.2	73.5
Electricity*.....	3.7	6.2	8.6	11.1	6.2	7.4	4.9	4.9	7.4	8.6	9.9

*This line shows the per cent of decrease in the price of electricity on the dates named as compared with the price in December, 1913. These figures are based on the weighted averages of consumption at the various rates charged.

The Customers' Magazine

By J. Lightbody

Publicity Manager, British Columbia Electric
Railway Company, Ltd., Vancouver, B. C.

EVERY medium of advertising has some merits. The newspaper, the billboard, the car card, direct mail—each of these classes has particular advantages for certain products and certain kinds of advertising. There is another medium, available to power companies as to no other industry, that is as yet almost undeveloped and presents 100 per cent perfect circulation and a high probability of being read. It is the customers' magazine. If its character is determined properly and if it is well conducted, the customers' magazine will not only be effective in fostering good will for the power company but also will be an excellent medium for advertising the company's services and merchandise.

It was after a thorough investigation into the cost and the merits of such a publication that the British Columbia Electric Railway Company started "Utility Topics" at the beginning of 1925.

One of the factors which weighed with the company was the success of another publication begun nine years ago for street car patrons. "The Buzzer," as it is called, is published weekly and has had a marked effect in improving public relations. It gave direct contact with car riders as no other medium could. Why then should a similar success not be made with a publication to 65,000 light and power or gas customers?

The size decided upon was 5 x 6½ in.—small enough to fit a pocket and easy to mail. Each issue contains 16 pages, and it is published every other month. The reason for this was to enable the machinery of publication to get into smooth running order before more frequent publication was adopted.

As all light and gas bills are delivered, the distribution of "Utility Topics" costs comparatively little as the magazine is handled by the same men. It has the effect, however, of spreading the distribution over the entire month which is no drawback, requiring only some adjustment in editing.

The arguments in favor of a customers' magazine as viewed by the company are somewhat as follows:

1. We had a complete mailing list of every house with which we did business and as our territory was practically 100 per cent wired, no one would not receive a copy. This mailing list was too valuable not to use. Other concerns would give thou-

HOW many power companies have wished for 100 per cent circulation of their consumers with some particular news story or advertisement? The B. C. Electric Railway Company, Ltd., recently has instituted "Utility Topics," a bi-monthly customers' magazine which gives this service. The reasons for the establishment of the magazine and some of the results which have developed are described in this article.

sands of dollars for it and indeed many applications had been received for the use of at least portions. As our gas territory is not so large as our electric, portions of the magazine devoted to gas might be read in towns where it would have no effect. On the other hand, it would circulate among homes which were in the gas area but which did not use gas service, thus promoting an extension of gas service. On the whole, there was no waste circulation regarding the electric service and

comparatively little regarding the gas service.

2. Our customers' magazine has a larger circulation than any other publication in our territory. This stands to reason when a copy goes to practically every home. Again, this will be true of every other power company, at least in the West, where the percentage of wired houses is so high. There will seldom be found a newspaper with so saturated a territory and yet with no waste circulation outside the area in which the power company does business.

3. It gave us a medium of our own in which we could say what we liked and do what we liked. Previously if we wanted to have published a story on lighting the home, despite the fact that it was of public interest and not propaganda, we had to coax some editor to run it. If the newspaper published no suitable page, it was not run. With a customers' magazine, we are independent. In time we probably will make editors realize that what we are printing is of interest to their readers, and they will print similar stories more readily.

4. From the beginning it was our plan to make our magazine a household one, with a particular appeal to women. Our problem was one of merchandising rather than obtaining good will. We conduct our public relations publicity in other mediums. That, of course, is a question for the individual company to determine. In our case, we felt that a magazine could be used best for selling services or merchandise. The national magazines with the largest circulations with possibly two exceptions, are all women's magazines. Nor were there in our territory any local women's publications. Therefore, it seemed to us that a magazine largely of interest to women would find a place and be read. This appeared to be particularly reasonable when most of the appliances sold by electric or gas com-

Attractive covers and items of appeal to the housewife are among the special features of the B.C. Electric Railway Company's magazine

6. Previous to publishing "Utility Topics," our company sent circulars and broadsides on one appliance or another nearly every month. To some extent the customers' magazine has curtailed this. We still send our advertising broadsides, but it is not neces-

There is always a pictorial page in the center of the issue using pictures of general as well as company interest. A story of general civic interest may be printed at the beginning. At any rate, the leading story must be of interest and must not have any tinge of propaganda. The last two pages are always advertisements. A page of recipes generally is run near the end.

The front page is an entire half-tone, which is changed each issue. The illustration is always some attractive scene which may or may not have any company significance. As there is plenty of scenery around the hydroelectric plants, the front page frequently portrays some company property in suitable surroundings.

Owing to the tabloid size of "Utility Topics," there is comparatively little room for illustrations. These generally are worked into the hand-lettered heads, which also give a snappy appearance to the pages.

The paper used is a book stock. The factor which prevents use of a heavier grade of stock is the question of delivery. The bill deliverers would find it impossible to carry their quota if a heavy stock were used.

On the whole, we have every reason to believe that "Utility Topics" is giving us excellent value in advertising. We reach 65,000 homes every issue, we have a direct contact with our customers, and we have a medium in which we can print what we like. Can anyone ask for more?

Kitchen Lighting Unit Campaign of Southern California Edison Co.

SELLING 15,000 kitchen lighting units in a sales campaign of less than six months over an area including 255 incorporated cities and towns is the record made by the sales organization of the Southern California Edison Company.

The units were sold on a fifteen-day free trial—no money unless you decide to keep it—basis. If at the end of the trial period the customer decided to buy the unit, he was expected to pay 95 cents with his next succeeding lighting bill and \$1 per month thereafter until \$7.95 had been paid. If the customer decided that he did not wish to keep the unit it was taken out immediately and the original fixture replaced.

The Southern California Edison Company operates in thirty-one districts under as many district managers. It was not deemed advisable to attempt to cover the whole territory simultaneously. Sales crews of six to eight men were organized and sent out into the districts where they were placed in charge of regular salesmen permanently assigned to that district. When a crew of salesmen completed work in one district they were transferred immediately to another district and began work anew and this served to minimize training expense to the company.

Many problems presented themselves to be solved when the campaign was in the making. Attempting to profit by the experience of others in similar campaigns, those in charge read every available piece of literature on the subject and carefully planned the attack so as to get the maximum results with the minimum expense. It was decided to send out circulars to arrive at the consumer's home about three or four days ahead of the salesman's call. Much careful thought went into the making up of this circular. A complete layout of newspaper advertising together with window displays had to be planned

to cover the entire campaign. The details of sales conditions, which have been explained above, were decided upon only after much deliberation.

Practically all of the 255 cities and towns served by the company have wiring ordinances and license regulations, including a fee for inspection of fixtures. In most of the cities this inspection fee was waived, but some of the smaller places required it. To meet these conditions the company made use of the local contractors for the installation of the units. Where a city or town had more than one dealer the work was divided so as to give all of them an equal opportunity. Use of the local dealers in this way served to focus their attention on the possibilities of more and better lighting business, and this helped perpetuate the desired effect of the campaign.

The salesmen found they could increase their output by carefully working the smaller shops and stores, inasmuch as it was possible to sell as many as three or four units to one consumer of this type with less sales talk than was necessary to sell one household installation. In one case 100 units were sold in three business blocks to these small merchants. In working up this type of business it was found at times that the unit which was being sold was inadequate to light a store or shop because of the high ceilings. Taking advantage of likely prospects of this kind discovered by the unit salesmen, live dealers were able in many cases to substitute larger fixtures requiring higher wattage lamps. Since the campaign had as its object the building up of the connected load, sales of this kind were very welcome to the company and made additional business for the dealer.

As the campaign progressed it was found occasionally that it was impossible for dealers to make prompt installations. To meet this condition men were sent out in pairs, one man to sell the unit and the other man to install it. Each of these crews was supplied with a list of customers, listed in meter book order, together with a supply of 15 or 20 of the lighting units. In towns where the houses were close together a salesman worked a block and then turned his sales over to the installer, who immediately proceeded with the installations. In the rural districts with the houses scattered salesman and installer worked together, the salesman assisting in the installation to save time.

Frequently a housewife with whom the salesman came in contact would be agreeable to giving the new unit a trial, but would be unable to convert her husband to the new idea. With a salesman and an installer working together, selling and installing a unit at the time of their first call, the housewife had a brilliantly lighted kitchen to use as an argument in winning her husband's approval of the purchase. The psychology of teamwork entered into this pairing off plan, and it was found that two men working together developed a pride in making good clean sales and satisfactory installations. All difficulties which may have arisen between the salesman and installer were eliminated by this arrangement. Teams working on this basis averaged about 12 sales a day, and this method of operating proved to be the most satisfactory system worked out.

The Application of Electricity for Domestic and Industrial Production of Heat

By Arnold Pfau

President, American Resistor Company
Consulting Engineer, Hydraulic Department, Allis-Chalmers Manufacturing Company,
Milwaukee, Wis.

CONSIDERABLE discussion recently has taken place relative to this important subject and the fact that many power companies have embarked on a lively campaign to sell electrical appliances for the purpose of increasing their load and for improving their load factor, may justify an analysis of the various factors involved in this problem, not so much one as coming from a specialist in this particular field but rather from a layman, so to speak, one who surveys the field from the point of view of the consumer.

Application of electricity for producing heat, whether domestic or industrial, is affected in principle by the following two factors: 1. Initial cost of investment. 2. Cost of operation.

Initial cost of investment may be subdivided into two groups. a. Cost of equipment proper; b. Cost of installing same.

Cost of Equipment Proper

The question of cost of equipment is of more vital importance as relating to domestic application rather than industrial application. Investments for domestic application directly affect the pocketbook of the individual, and it may be seen at once that many applications are at present still out of reach of a great number of prospective consumers for the simple reason that these applications are beyond their means. Much has been done, of course, to reduce the first initial expense by a so-called installment plan. However, any level-headed buyer at once will realize that when he is through paying the total price paid is the same or a trifle above the original cash price. In other words, the initial price of the equipment still represents a heavy investment.

Investments for industrial application are justified when the total returns derived therefrom cover the interest on the investment, the depreciation and operating costs. When these factors are correct the problem simply is reduced to one of a banking transaction, the banker's funds taking the place of the individual's pocketbook.

Cost of Installing Equipment.

The cost of installing domestic equipment also has an important bearing as affecting the prospective consumer because in most of these cases the consumer is not able to do the installing himself, but is dependent upon a contractor or upon the power company doing the installation work. The expenses thus involved reach an amount which is a goodly portion of the cost of the equipment proper and which, therefore, again constitutes a serious drain on the individual's pocketbook.

Industrial installation costs, of course, involve a much smaller relative expense because most of this work can be done by the purchaser's staff and therefore does not carry the overhead charges unavoidable with a contractor or a power company.

Cost of operation also may be subdivided into two groups: a. Cost of electric current; b. Cost of upkeep.

Cost of Electric Current

It is evident that the cost of electric current plays a prominent part in the problem of analyses of economy of electric operation versus application of fuels (wood, gas, oil, etc.). It would, however, be folly to base such a comparison solely upon costs without giving due credit to the many advantages offered by electric heat. In general, however, such a comparison resolves itself into an analysis of two principal factors, viz:

- (1) Cost of fuel versus electric energy;
- (2) Economy in production, i.e., saving in labor, reduction of waste, or scrap products and quality of product proper, as also the questions of cleanliness, absence of smoke or gases which may affect the product subject to heat (air in rooms, flavor of dishes cooked, product manufactured industrially), and also flexibility in application both as to time and individuality of location, etc.

In domestic applications it is difficult to express all these values in abstract figures, for the reason that many of them represent tangible assets only, the values of which vary with the taste of the individual user. As relating to domestic application the problem reduces itself to a comparison of the monthly electric power bill as against a monthly gas or fuel bill, the electric bill being credited with a tangible amount valued by the individual consumer.

As relating to the industrial application the various items can be expressed more readily in abstract figures, and the item of individual sentiment disappears completely. Here the superiority of the product manufactured by one or the other method can be valued in actual figures as also can the saving in labor, in waste or scrap products. The tangible item of convenience appearing in domestic application can be recorded directly by the health statistics of the factory crew, the statistics of accidents, etc., all of which reduces itself to almost a purely mathematical statistical procedure.

Cost of Upkeep

The term upkeep is better fitted in the case of industrial application. For consideration in connection with domestic application it may better be termed

"cost of replacement". Here we find a principal difference between the application of fuels and of electricity. Fuel leaves byproducts as the result of combustion, and these require removal (in a greater or less degree) and affect the parts in contact with the fuels or products of combustion. Electricity leaves no byproducts and therefore speaks for itself as to cleanliness and absence of cost for removing byproducts. However, the carrier of the heat-producing electricity, the so-called "resistor", is subject to unavoidable and gradual destruction like a bulb of an incandescent lamp, and this introduces the problem of periodic replacement which involves the expense for replacing materials and for installing them, as well as interruption of service, which is not as vital in domestic operation as it is in industrial operation where it incurs loss of production. Therefore, it seems that next to the item of rates for electric current the question of upkeep becomes a paramount issue because on it depends to a large extent the feasibility of using electric-heated or fuel-heated appliances.

If upkeep cost can be reduced to such a degree that it constitutes a small addition only to the electric current bill, then the battle of pushing the use of electrically heated appliances is more than half won. Upkeep cost, as stated before, should not only include the cost of materials to be replaced but also, and even more so, the tangible expense incurred, namely, the inconvenience of exchanging the materials and the interruption of service.

A close scrutiny of the item of cost of replacement proper at once will reveal a fact which may furnish the key toward a material reduction of cost. It is the heat-producing part, the resistor proper, which requires replacing, whether in domestic or in industrial application, but unfortunately so far it has been impossible to replace only the resistor, exclusively, because its mounting in many electric appliances is inseparably combined with other materials (refractory supports, etc.) which either must be removed when the resistor is exchanged, or must be renewed entirely with the resistor. The item of upkeep therefore is composed of several factors, namely, cost of resistor proper; cost of refractory material or mounting; cost of labor for exchange and interruption in service. All of these constitute an amount which in many instances renders the use of electric appliances uneconomical.

In domestic applications such as room heaters, kitchen ranges, etc., the temperatures required are moderate so that the life of the resistor proper is relatively long; therefore its actual replacement cost would be tolerably low. However, in most of these instances the resistor alone cannot be replaced readily by the layman-consumer but must be purchased and replaced together with its mounting. It is right here that considerable amount of money must be spent for replacing materials which really are not at all burned out and therefore would require no replacement. Again, it is often the accessory material which shortens the life of the resistor proper and thus increases the expense of upkeep. The accessory material or refractory often is the direct or indirect cause of short circuits which destroy the resistor proper, such

as is the case with kitchen ranges where the resistor proper is mounted openly in the refractory and where water or foods spilled over cause such destructive short circuits. This evident disadvantage has been eliminated partly by the use of heating elements in which the resistor is embedded entirely in the refractory and other materials so that direct contact of the resistor with the outside is avoided. It is needless to say that this cannot be done without adding a considerable item to the price of the heating element, and it also adds "dead or inactive material" which must be heated and which thus constitutes a considerable part of the electric current bill, at the same time delaying the process of quickly and economically producing heat and of transmitting it as directly as possible to the object to be heated and retaining a considerable amount of heat after none is required.

We all know that the laws of nature are immutably fixed. This, of course, applies also to the relation between electric energy and heat. One kilowatt-hour equals 3,412 B.t.u., not more and not less. No matter what a resistor is made of it cannot produce more B.t.u. per kw-hr. than the above law permits, and the efficiency of this transformation is 100 per cent. Nevertheless there is a wide range of difference between kilowatt-hours consumed for the purpose of heating an object and the actual heat transmitted to the object, just as there is, as we all know, a big difference between the price which the producer receives and the price the consumer pays, although the quality of the object (potatoes, etc.) may remain (more or less) the same.

This may be well defined by introducing the term "heat dissipation". Efficiency (e) can be defined as the relation between kw-hr. or B.t.u. input and heat output. Let B.t.u. be the heat input and B.t.u.₁ the heat output, or the actual heat absorbed by the object to be heated, then

$$e = \frac{\text{B.t.u.}_1}{\text{B.t.u.}} \times 100 \text{ in per cent.}$$

B.t.u.₁ = B.t.u. — ($a + b$) where
 a = heat absorbed by the mounting of the resistor;
 b = heat loss due to radiation into the space between the heating element and the object to be heated.

The value " a " is a quantity which is intimately interwoven with the type of the resistor, and it may be seen at once that with resistors requiring no refractory mounting or support the value " a " practically disappears.

The value " b " involves the question of design of the appliance, and the success of reducing it to a minimum depends upon the engineering skill of the designer of the appliance. This skill embraces the familiarity with proper insulating materials and the knowledge of the laws of radiation, circulation of air currents, etc.

If the items " a " and " b " can be reduced to a minimum then the efficiency and the commercial success of the electric appliance is assured, at least from the point of view of economy of current used.

A close examination of the factors determining the value " a " will furnish a key toward finding the most efficient heating element.

The heat absorbed by the mounting of the resistor not only affects the question of economy of total kilowatt-hours required but also affects the life of the resistor proper. It is evident that the inherent heat of the accessory (refractory) material partly surrounding or in contact with the resistor causes a temperature of the resistor proper which is, of necessity, higher than it would be if the heat radiated from the resistor were carried directly to the object heated. In other words, resistors surrounded by or embedded into accessory materials are subject to a higher temperature, and consequently their life must be correspondingly shorter. The gradual destruction of a resistor is evidenced by a gradual increase in resistance so that the kw-hr. absorbing capacity is reduced gradually and the heat produced therefrom becomes less and less. This takes place even on the assumption that the resistance of the resistor remains uniform over its entire conductive length and area. Quite frequently, because of lack of homogeneity of the material of the resistor due to the physical discrepancy in conductive areas, so-called hot spots develop, that is, spots of high resistance in the resistor, whereby locally high temperatures are produced which destroy the life of that particular portion of the resistor and finally render the entire resistor useless. Where resistors consist of a series of coils it is evident that any short circuit between two individual coils affects the resistance and also brings about the condition of hot spots described before. From this it is at once evident that a resistor consisting of a single conductor is freer from the danger of short circuits of the above character.

Other items worthy of discussion are, for instance, those of conductivity, radiating capacity and physical strength of the resistor material.

Conductivity

In order to carry a desired amount of electric current a certain area of conductor is required, and this in turn depends upon the specific electrical conductivity of the material of the resistor. A high specific electrical conductivity requires a smaller area than a low specific conductivity for a fixed amount of current to be carried.

Radiating Capacity

The amount of heat radiated from the resistor depends upon the temperature drop between the resistor and its surrounding space and also the radiating surface of the resistor, both as to physical size as well as condition of smoothness of surface.

Physical Strength

The strength of a resistor enters into the problem to quite an extent inasmuch as the resistor must be either self-supporting, i.e., it needs to be supported only at its two terminal ends, or if it is not self-supporting it requires special mounting or embedding in a refractory material, as previously explained.

A clear comparison of these three factors may be obtained by means of tentative mathematical formulae, based for simplicity's sake on a conductor of circular area such as is the case with wire resistors or bar-shaped resistors.

Conductivity

This may be illustrated by formulae. The well known relation $C^2 R = W$ (where C represents the ampere capacity, W the watt capacity and R the resistance in ohms per unit of length of the resistor) can be transformed by introducing the following relations:

$V C = W$ (where V equals the voltage of the electric energy flowing through the resistor) and

$$(1) \quad R = \frac{\frac{\phi^1}{\pi d^2}}{4} = \frac{\phi}{d^2}$$

where ϕ represents a coefficient embodying the electrical specific resistivity or resistance of the resistor material.

Thus we obtain

$$(2) \quad \frac{C^2 \phi}{d^2} = W$$

or the electric energy W carried in the resistor is in direct linear proportion to the length and the electrical specific resistance and inversely proportional to the square of the diameter of the resistor.

Radiating Capacity

The surface of a circular section resistor of the diameter d and length l is $F = \pi d l$ and the heat radiated from this surface is

$$(3) \quad H = \theta^1 F (t_1 - t_2) = \theta d l (t_1 - t_2)$$

where θ represents the coefficient characteristic of the radiation of the surface of the resistor material and $t_1 - t_2$ the difference in temperature between that of the resistor proper and that of its surrounding space or object.

From the above it may be seen that the heat H radiated is in direct and linear proportion to the radiating coefficient, the diameter, the length and the temperature drop.

Physical Strength

The physical strength can be analyzed best by the deflection of a conductor, supported freely on each end or terminal, and subjected to its own weight P . (See Fig. 1.)

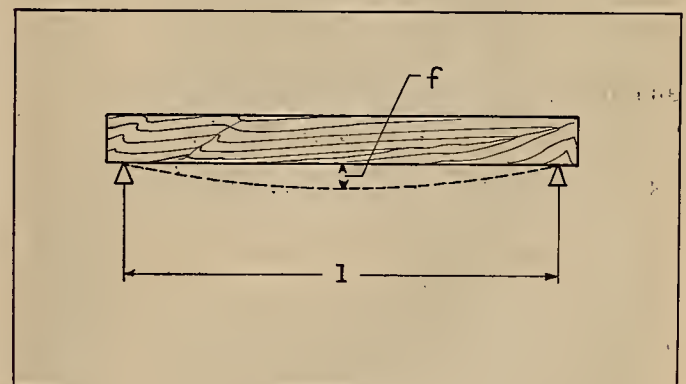


Fig. 1

The deflection f can be obtained from the well known formula

$$(4) \quad f = \frac{3}{384} \frac{P l^3}{E I}$$

where P equals the total weight of the resistor of length l , E , the modulus of elasticity of the resistor material and I the moment of inertia of bending of the resistor.

Assuming a circular area of the resistor and a uniform diameter d throughout its length l , also a homogeneous material, so that

$$(5) \quad P = \Sigma l \quad \frac{\pi d^2}{4} l = \Sigma d^2 l$$

where Σ represents the specific weight of the material and since

$$(5a) \quad I = \frac{\pi d^4}{64}$$

for a circular area, we have

$$(6) \quad f = \frac{3}{384} \frac{\Sigma d^2 l^3 64 \pi}{E \pi d^4} \quad \text{or}$$

$$(7) \quad f = \frac{M \Sigma l^4}{E d^2}$$

The dimensional values l and d can be eliminated by using equations (2) and (3), since

$$d^2 = \frac{c^2 \phi}{W} \quad \text{and} \quad l = \frac{H}{d \theta (t_1 - t_2)}$$

or substituted in (7)

$$(7a) \quad f = \frac{M \Sigma}{E \frac{c^2 \phi}{W}} \left[\frac{H}{\sqrt{\frac{c^2 \phi}{W}} \theta (t_1 - t_2)} \right]^4$$

or re-arranged

$$(7b) \quad f = M \frac{\Sigma}{\phi^3 \theta^4} \frac{1}{E} \left(\frac{H}{t_1 - t_2} \right)^4 \frac{W^3}{c^6}$$

The value $\frac{H}{t_1 - t_2}$ represents the heat radiated per unit of temperature drop, or a certain amount of B.t.u. and is therefore proportional to the electrical energy, kw-hr. or W .

$$\text{Thus } \left(\frac{H}{t_1 - t_2} \right)^4 = n W^4$$

and since $\frac{W}{C} = V$ as used before, we have

$$(8) \quad f = M^1 \frac{\Sigma}{\phi^3 \theta^4} \frac{1}{E} V^7 C$$

In this equation the dimensional values d and l are replaced by the values

Φ specific electrical resistance of resistor material
 θ coefficient of surface radiation of resistor material
 Σ specific weight of resistor material
 E modulus of elasticity of resistor material
 V voltage of current used.
 C ampere capacity of current used
 M^1 = an absolute constant.

Although this formula is of a purely hypothetical character it gives a good picture of the inter-relation of some factors affecting the physical strength of a resistor. It is evident that other similar equations can be derived by substituting for the length (l) or the diameter (d) values embodying for instance the coefficient of expansion of the material.

It may be seen at once that the specific weight (Σ) and the ampere capacity (C) affect the deflection directly and linearly. The modulus of elasticity (E) of the material affects the deflection linearly but inversely. The electrical specific resistance (Φ) and the radiating coefficient (θ) affect the deflection more materially, viz: inversely in the third and fourth power, respectively, and the voltage (V) of the current has a most prominent direct effect, viz: relatively in the seventh power.

Doubling the specific weight (Σ) of the material and doubling the amperes (C) each doubles the deflection. Reducing the modulus of elasticity (E) to one-half also doubles the deflection. Doubling the specific resistance (Φ) reduces the deflection eight-fold. Doubling the radiating quality (θ) of the material shortens the resistor and thus reduces the deflection sixteen-fold, and doubling the voltage (V) increases the deflection one hundred and twenty-eight-fold.

From the above it may be seen at once that a heavy resistor material (large Σ) and one of low specific electrical resistance (Φ) increases the deflection tremendously, even to the extent that such a resistor becomes incapable of being self-supporting. The conclusions drawn from the above tentative mathematical formulae are corroborated by the fact that resistors of high-grade metals of low specific resistance, i.e., of high conductivity, must be made of wire coils in order to keep the required conduc-

tive area $\left(\frac{\pi d^2}{4} \right)$ small, and in order to obtain enough

length (l) to carry only the desired amount of electric energy. The coil, however, is not self-supporting, and so requires an accessory material for support.

It should seem in order, therefore, to look for a material which has a moderate specific conductivity

—so that a reasonably large area or diameter is required that at the same time increases the radiating surface and permits of a more simple form of resistor, both as to physical shape and as to mounting.

The modulus of elasticity (E) also plays an important role because it is a function of the temperature and with metals decreases as the temperature increases. Thus the deflection becomes greater, which, as previously pointed out, is an undesirable feature.

A resistor material with a modulus of elasticity which is not reduced seriously by high temperatures, i.e., which does not deflect materially when supported only at the two (terminal) ends of the resistor therefore should be looked for.

Since metals have a relatively high specific electrical conductivity and have a modulus of elasticity which decreases appreciably as the temperature goes

up, it follows that in order to reduce the effect of these undesirable factors a material should be looked for which is non-metallic and which, of course, is capable of resisting deterioration under as high temperatures as can be produced for practical purposes. Such a new non-metallic resistor recently has been introduced to the market. The resistor is a mixture of metallic and non-metallic ingredients, moulded into suitable forms and heat-treated. The product is a solid, hard mass of sufficient rigidity to permit of self-support between the two terminal ends, and is capable of producing temperatures as high as 2,800 deg. F. without uncommercial deterioration. The use of a mixture of ingredients permits of a practical variation of the value (Φ) and to some extent (E) so that the cross-sectional areas and lengths of such resistors can be varied within practical limits to suit available space for a given amount of electric energy to be carried. The same applies also to the degree of heat to be produced.

Since this kind of resistor is capable of self-support it eliminates two vital factors which were pointed out before as affecting the question of economy of first cost and of upkeep.

The first cost is reduced because the refractory mounting is eliminated, aside from the fact that the material proper is not as costly as a high-grade metal or alloy. The upkeep is reduced because only the resistor proper need be replaced. This permits of replacement at low cost and simplifies the actual work of replacement in that the resistor is not a delicate piece but one which may be handled readily by a layman and readily removed without requiring special skill.

These advantages will prove of tremendous value both in domestic as well as industrial application.

If the simple resistor proper of the electrically safe single-conductor type (not exposed to the danger of becoming short-circuited) can be exchanged in a kitchen range, for instance, as easily as a lamp bulb by the housewife without requiring skilled assistance, and if such a resistor piece proper may be obtained at moderate cost and readily kept on hand in reasonable quantities, the battle towards increasing the sale of such electric appliances and of thereby increasing the loads of the power companies is half won.

If a resistor can be used in industrial heating appliances that is so self-supporting that its terminal ends may be kept outside of the high temperature heat chamber, if its mounting is so simple that each individual resistor may be removed without requiring a complete shut-off of the furnace and a consequent total interruption in production, the tangible assets of advantages become abstract figures which credit the electric power bill to such an extent that the question of feasibility of using electricity at reasonable rates versus fuel once and forever is settled in favor of electricity.

If such a resistor is capable of commercially producing industrial heats which heretofore could not be produced except by the electric arc, which in many cases prohibits its application, the field of industrial application of electric heat can be widened tremendously.

It would lead too far here to dwell on all the many other points involved in this important discussion, the intent of this article having been only to point out to power companies a new and promising field of activity opened up by the introduction of the non-metallic resistor.

Electricity Used in Process of Coloring Citrus Fruits

CITRUS fruits attain their sugar content and are picked long before they reach the desired golden color, which must be added by artificial means. The transformation of the partially colored oranges as picked from the trees to the pile of gold appearing on market stands now is being brought about electrically.

The electric method is to place the boxes of fruit in a tightly closed room, approximately 15 x 25 x 10 ft., and to produce a temperature of about 80 deg. F. by means of a non-glow heater, usually of 5-kw. capacity, either portable or installed in the wall. This constant temperature, together with the moisture of the fruit, causes the fruit to sweat. It is necessary to introduce certain gases into the room to produce the desired color, and after experimenting for some time, the United States Department of Agriculture has recommended the use of ethylene in quantities of one part gas to 10,000 parts air. Three applications of gas and two to four days in the sweat room complete the transformation, and so satisfactory are the results that citrus growers are adopting the electric method wherever power is available.

The method formerly used was to heat the sweat rooms by means of kerosene lamps which, when smothered, produced carbon monoxide, a gas which aided in the coloring process.



Portable 5-kw. heater used in sweat rooms to color citrus fruits. Ethylene gas is used with the electric heat

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Blizzards Fail Against Mountain Power Line Construction and Maintenance Features of Construction Line Operating at an Elevation of 9,500 Ft.

By G. C. HECKMAN, Superintendent of Electrical Construction, Southern California Edison Company, Big Creek, Calif.

Several years ago, when the Florence Lake tunnel and dam were contemplated it was thought by some that there would be great difficulty in maintaining a transmission pole line into and over the mountain fastnesses of this project. However, the progress records made in the building of this tunnel put down any doubt there might have been concerning the reliability and continuity of

Since the line has been entirely of pole construction there has been little or no trouble. While there were several hundred hours outage during a year's period when the line was in part on trees, there has been but a few minutes outage during the past year and this only when there was momentary trouble on the entire system. This single-circuit line stood up under the blizzards which sweep across Kaiser Pass, at an altitude of 9,500 ft., when not even the huskies of the Alaskan dog team could make the grade.

Uninterrupted service over this line, the main artery of the tunnel work, was of paramount importance. Therefore it was essential that maintenance work be done in such a way as to eliminate interruptions in this work. However, this maintenance was not accomplished without severe hardship, well organized and well trained patrolmen and a practical radio communication system. There were times when as many as seven men acting as snowshoe trail breakers were necessary in order that one patrolman could reach a point of trouble with sufficient physical strength left to do the necessary work. Extreme emergencies such as this were eliminated after the line was constructed entirely on poles, the right-of-way cleared of overhanging trees and other precautions taken.

During the winter months and at times of severe weather, patrolmen were stationed at Cascada (Big Creek), Huntington Lake, Camp 60, Camp 61-



Fig. 2—G. C. Heckman bucking 5 ft. of snow while inspecting Florence Lake line during winter time

C, Camp 61, Camp 62, and Camp 63. This covered all strategic points of the line (see map). Also there were radio stations at each of these locations. These men not only patrolled their assigned portions of the transmission line but also took care of the line work in and about their respective camps and were subject to call day or night.

All clearances for line work or switching were given and returned by radio telegraph. No electrical accidents, either on the line or in the camps, were experienced during the whole construc-



Fig. 1—A section of the Florence Lake 30-kv. line showing original construction. Serious outages were chargeable to this type of construction

service due to consideration of the rugged nature of the country involved. For the first two years of the construction period the line was a combination pole and tree line, that is to say, sections of the line were supported on poles and other sections of the line were built on trees. This was done in spite of the fact that it was known that a tree line is unreliable for a project such as this. The line was constructed in this manner principally, as thought by some at the time, to expedite matters and save expense. Troubles and outages were continuous with this type of construction.

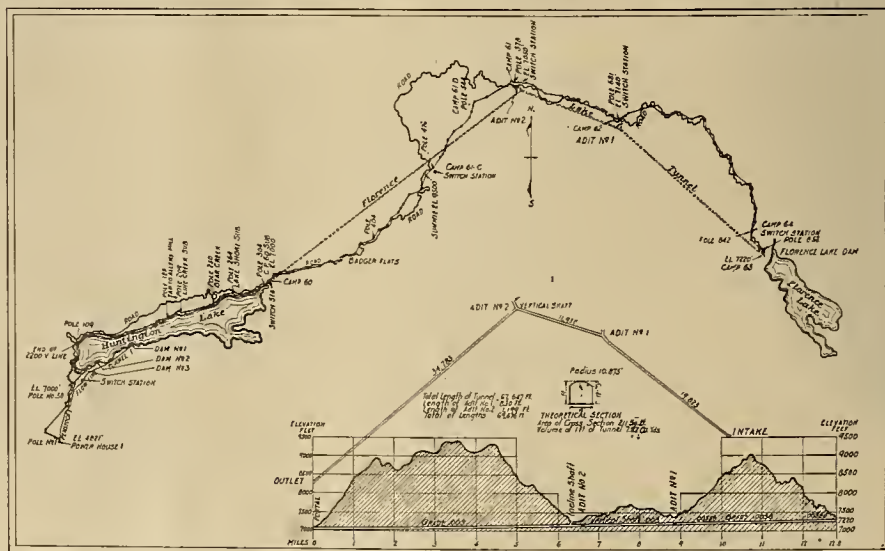


Fig. 3—Map showing the relative location of the tunnel, road, transmission line and the two lakes. Relative elevations may be checked by reference to the profile

tion period. A definite system for the operation of this line was drawn up and distributed to the proper parties in the form of a circular letter. The context of this letter was as follows:

Wait at least one minute before closing switch on Florence Lake line after an interruption. If switch opens violently, wait ten minutes and again try to energize.

Notify the Cascada telephone operator in case of any trouble.

Instructions to Upper Camps

In case power is off more than five minutes, open 30-kv. oil section switches, only, in line to next camp, leaving the local transformers connected unless there is trouble in camp. Stand by for test.

At the end of ten minutes, a test will be made on line as follows:

1. Power house operator will energize the line to Camp 60.
2. As soon as power is on, 60 will energize to 61.
3. Camp 61 will energize to 62 in the same way.
4. Camp 62 will close switch to 63.



Fig. 5—Typical tie-down construction used for vertical angles in line

also in the electric shops and patrolmen's quarters.

This uniform scheme of operation helped to minimize outages.

Practically all of the holes for the pole line had to be shot, as the country is mostly of solid rock formation.

For the voltage and actual carrying capacity of the line, the construction was unusually heavy. As may be seen in the accompanying illustrations three standard insulator disks are used for both strain and suspension points. Numerous tie-downs are used and additional supporting insulators are used at all strain locations. These special features have contributed greatly toward the uninterrupted operation of the line.

The beginning of the line at Power House 1 was located at Cascada. The line was supplied by three banks of 6.6/30-kv. transformers connected to a bus in such a way that one or more banks could be used according to the demand. These transformers were fed from a 6.6-kv. bus which in turn was supplied through automatic oil switches from the 6.6-kv. generator buses. All buses were in duplicate.

The major portion of the load on the line naturally was compressor plants. The balance of the load was made up in saw mills, electric shops, machine

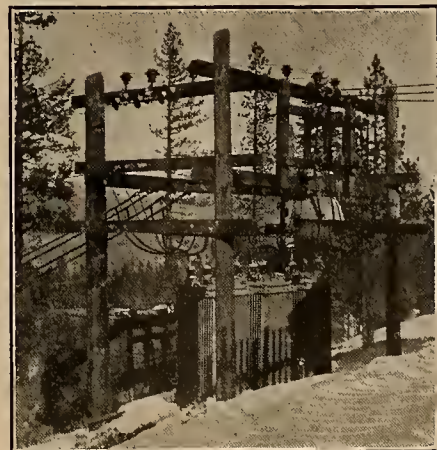


Fig. 6—Typical substation on Florence Lake 30-kv. line, serving construction camp No. 61 at El. 7,050

shops, warehouses, carpenter shops, bakeries, mess halls, garages, ice plants, hospitals, pumping plants, motor-generator sets for electric tunnel locomotives, radio stations, offices and general illumination. All the distribution was metered at the respective load locations, and a complete and accurate accounting was kept of all power used, thereby making it possible to distribute to each account the proper proportion of power consumption.

Two different pole-line methods were used in the construction. Two sections were built with three-pole construction at angle points, and the balance of the line was built with A-frames at the angle points. It is thought that the A-frame construction is desirable because of stability, fewer holes to dig for anchors, and a lesser number of places such as guy lines and bridles on and around the structure for a snow load to accumulate. The different types of line construction are shown in the accompanying illustrations.

Sectionalizing oil and disconnect switches were provided at each camp to facilitate the definite location of the



Fig. 7—Typical 3-pole angle tower used at certain locations on Florence Lake 30-kv. line. Note spare insulator units located on pole to assist maintenance crews. Pole No. 104 at El. 7,000

part of the line in trouble. As soon as the faulty section was located this section was isolated and the balance of the line towards the source was energized. This method kept the maximum amount of line in service while the trouble was being cleared.

Latest Thing in Shorts.—A 3-ft. king snake some time ago caused an interruption to service over the main transmission line of the Southern Sierras Power Company in the Imperial Valley when it crawled to the top of a transformer, 15 ft. from the ground, near El Centro, Calif., and short-circuited the 17-kv. terminals. Knocked to the ground by the force of the short, the snake started out in quest of further excitement but was killed at the door of the power house by the operator.



Fig. 4—Typical section of 30-kv. line after reconstruction which removed it from the class of temporary construction lines to that of a genuine transmission line. A standard A-frame corner tower appears in the foreground. Note stock of replacement insulator units hung on pole to assist maintenance crew

That section on which trouble appears should be left out subsequently and the good portion of the line energized as above.

Establish radio communication as soon as possible and advise the operator if there is any trouble in camp.

Patrolmen should stand by in camp until tests have been made to locate the section of line trouble. Proper clearance must be obtained before going out on the line.

Disconnect switches at Huntington Lake and Camp 61-C are not to be opened except on instruction from Cascada.

Under no circumstances are telephones to be attached to the 30,000-volt line, except by special instructions and approval by Mr. Heckman, superintendent of electrical construction.

These instructions will be posted in all Florence Lake line switch and transformer houses,



Fig. 8—Winter maintenance work on the Florence Lake 30-kv. line is assisted materially by "Jerry" and his famous Alaskan dog team. Details are described in the article by G. C. Heckman on preceding pages

Single Mechanism Operates and Interlocks Two Switches

For locations where it is necessary to effect a quick change-over of a circuit from one source to another the San Diego Consolidated Gas & Electric Company has developed the mechanism shown in the accompanying illustrations. This arrangement is particularly serviceable where conditions do not per-

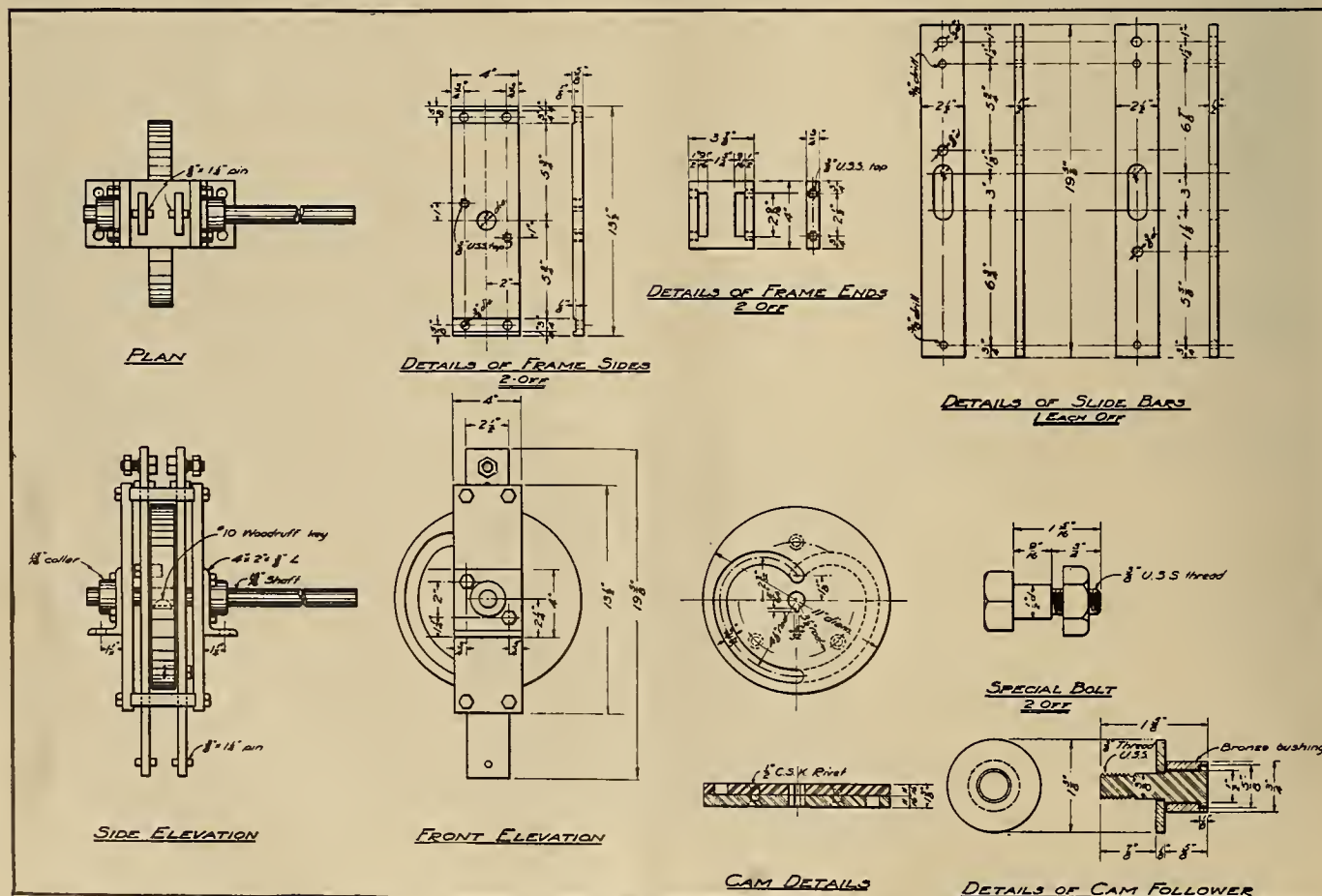
mit or do not warrant an automatically controlled double-service supply for feeder lines. It is further adaptable to installations where it is impossible to tie directly together on a common bus the two or more supply lines which would constitute the duplicate supply. Unsatisfactory voltage conditions might

make it undesirable to effect such a tie. The possible applications of the equipment are many.

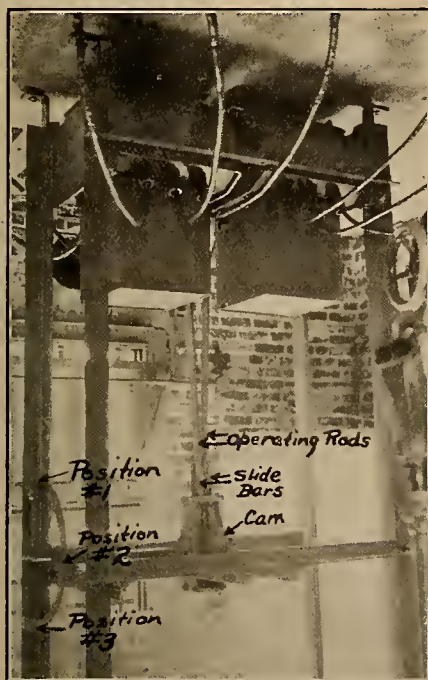
The apparatus itself is simple and easily made, as reference to the illustrations will show. The piece of most interesting design is perhaps the cam. This cam is so designed that rotation through an angle of 180 deg. will supply the motion necessary to open one oil switch and to close another. It may be seen that the cam is double-faced and has a runway for a roller on each face, one for one switch and one for the other. These rollers are mounted on the ends of slide rods which are supported on the frame which mounts the cam itself. From the slide rods operating rods extend up to the operating



Close-up view of one side of the operating cam. This is the heart of the switch-operating device described in the accompanying article



Design details of mechanical operating and interlocking apparatus developed by the San Diego Consolidated Gas & Electric Company



Installation of two oil switches and single-cam operating device which also interlocks the two switches

handles of the switches. The two switches are mounted so as to throw the two operating handles together, thus necessitating only one cam for the operation of both. This results in more positive and safe sequence of operation of the switches.

An operating handle is carried to the side of the frame that carries the switches. There a segment over which the handle slides is provided. This segment is arranged so that the handle may be locked in either extreme position or in mid-position. When the handle is in one extreme position one switch is closed and the other open. With the handle in the opposite extreme position this condition is reversed. Both switches are open when the handle is in mid-position; thus it is apparent that one switch cannot be closed before the other is open.

Electrical Mucking Machine Used in Shaver Lake Tunnel

Aiming to expedite the removal of the muck in the construction of the tunnel between Huntington and Shaver Lakes, the Southern California Edison Company has decided to use, in the various headings, the Conweigh direct drive electrical mucking machine equipped with a 50-hp. motor.

This tunnel has a cross-section equivalent to a circle with a diameter of 13½ ft., and it is impractical to use the large air-operated steam shovels such as were used on the 13-mile Florence Lake tunnel with its 15-ft. cross-section.

The bucket of the machine is extended from one end of a four-wheel truck on a rigid arm which may be swung from side to side or up and down. In the truck are contained the motor and machinery for operating machine, together with apparatus for handling an endless belt conveyor, which extends out over the rear end of the truck in such a manner as to permit of running a muck car under it to receive the muck. The bucket or scoop is forced into the muck pile, while in a

horizontal position, by the moving forward of the entire car. When it has buried itself in the muck the scoop arm is elevated and the scoop pours its contents back onto the conveyor belt which carries it out to the muck car in the rear.

In driving the pioneer 8 x 8-ft. drift for the Moffat tunnel this same machine, cut to the smallest workable dimensions, is being used and proving to be extremely economical and rapid.

Electric Furnace in Hawaiian Sugar Refinery

From the Pacific Islands comes an interesting account of a novel application of the electric furnace. This furnace is being used by the McBryde Sugar Company of Hawaii for annealing sugar-mill roller shafts. Experience has shown that the life of these shafts can be lengthened materially if they are annealed periodically. This treatment seems to relieve the strains and crystallization caused by sugar rolling.

The electric furnace itself is about 3 x 3 x 20 ft. in dimensions and is heated on the sides and bottom by Westinghouse type S furnace elements. Special alloy V-blocks are used in the furnace to support the shafts during treatment. Automatic temperature control is provided by a Leeds and Northrup pyrometer which operates through suitable relays and contactors.

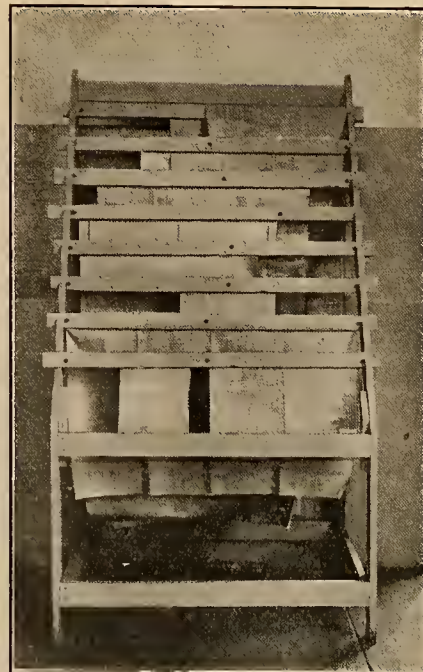
A nickel-steel roller shaft about 15 ft. long and 18 in. in diameter, containing about 0.3 per cent carbon and 3 per cent nickel, was treated recently in this furnace. The shaft had been in service for some four years and was about to be transferred to a new sugar roller. Hence it was decided to give it the heat treatment. Nine hours were required for the shaft to reach a temperature of 1,200 deg. F. The temperature was held at this point for an hour and then allowed to drop slowly, dropping to 700 deg. in four hours. The total cooling time was 52 hours.

Lake Fordyce Dam Being Raised; Slide Kills Three

Lake Fordyce dam, a rock-fill structure in northern California owned by the Pacific Gas and Electric Company, is being raised 47 ft. in height. The original structure was built some fifty years ago. Prior to the work now under way it had a maximum height of 90 ft. and a crest length of 800 ft.

The addition to the height consists of a derrick-placed rock wall along the upstream face of the old structure, backed by a loose rock fill. The new rock wall is 25 ft. wide at the bottom (on the crest of the old structure), and 10 ft. wide at the top. The upstream slope is ¾ to 1, and the downstream face is almost vertical. The plan contemplates laying this rock wall up carefully as a facing for the loose rock fill to be placed behind it. The upstream face of the rock wall is to be faced with concrete.

A break, in which about 1,000 cu. yd. of the downstream face of the rock wall slid down, killed three workmen and injured three others on Aug. 28. At the time of the accident several hundred feet of derrick-placed rock had been finished to full height at the north end of the dam.



Blueprints and wiring diagrams around a station are generally a source of annoyance because they are hard to keep clean and easily misplaced. The operators at the Newark substation of the Pacific Gas and Electric Company overcame this difficulty with the handy little rack shown in the accompanying illustration. This particular rack is made up of scraps of lumber, but is put together neatly and is painted to harmonize with the color scheme of the station. Common lath forms the binding strips which hold the blueprints in pre-selected groups

Wynooche Development Cost Estimated.—Carl F. Uhden, former chief engineer in charge of the construction of the Skagit River plant for the Seattle municipal lighting department, has completed a survey of the Wynooche power development, planned by the city of Aberdeen, Wash. (*Journal of Electricity*, May 15, 1925, p. 375.) In a twenty-nine page report to the city council Mr. Uhden states that 15,000 hp. can be developed at a cost of \$2,639,000. He states that the gross revenue from the first step in construction would, at the prevailing rates in a number of Pacific Coast Cities, be more than double the revenue necessary to take care of the annual obligations. As a result of his report, the city of Aberdeen will submit a \$2,639,000 bond issue to the voters this summer.

Permits for California Power Projects Issued.—Three permits covering the application of water from the North Fork of the Mokelumne River in central California have been issued to J. W. Preston, Jr., by the California Division of Water Rights. The project involves the construction of a reservoir of 60,000-acre-ft. capacity at Salt Springs. Two power houses are proposed, the upper one near the junction of Tiger Creek and the North Fork of the Mokelumne River, where 350 sec.-ft. of water will be used to generate 49,597 theoretical horsepower. The lower plant will be the existing Electra power house of the Pacific Gas and Electric Company where 225 sec.-ft. will be used to generate 37,483 theoretical horsepower. It is understood that Mr. Preston has a contract with the Pacific Gas and Electric Company for the output of the upper plant also.

IDEAS FOR THE CONTRACTOR

Second California Red Seal Home Built for Owner

Exeter Electric Company Makes Wiring Installation Which is Inspected by California Electrical Bureau

The second electric home in California to come under the inspection of the California Electrical Bureau under the Red Seal Plan recently was completed for R. R. Sherman, 224 North Dolores Street, Exeter, by the Exeter Electric Company of that town. Most of the electrical construction had been completed in this home prior to the time that the Red Seal specifications were announced. Although the home exceeded the requirements of the specifications in many respects, it was lacking in a few, so in order to make it a Red Seal home the necessary changes were made.

This company expects to build up many of its installations by calling attention to the standard established by the Red Seal specifications.

Pending the receipt of official Red Seals from the East, a letter was given to Mr. Sherman by George Rankin, field man for the California Electrical Bureau, stating that the home had been inspected and found to comply fully with the specifications laid down by the Society for Electrical Development and that certificates of proof would be given to Mr. Sherman as soon as they could be obtained.

Table 1 shows the various outlets installed and the number and kind specified for a Red Seal home. Contractors all over the state rapidly are grasping the sales possibilities in wiring homes which will meet the Red Seal standard specifications.

The minimum requirements for a Red Seal installation were given in the Aug. 1 issue of the Journal of Electricity (p. 95).

TABLE 1

Room	Light Outlets Installed	Switch Outlets Installed	Convenience Outlets Installed
Front porch.....	1	1	
Sleeping porch.....	1	2 ¹	1 ²
Service porch.....	2	1	2 ³
Living room.....	1 ⁴	2 ¹	4 ⁵
Dining room.....	1	3 ⁶	2
Kitchen	1	3 ⁶	1
Hall	1	1	
Bedroom	1	1	2 ³
Bedroom	1	1	1
Bath	1	1	1
Basement	1	1	1 ²
Garage	1	2 ¹	1

Service—1¼-in. conduit with three No. 4 wires. Meter space 30-in. x 36-in.

Range circuit—1¼-in. conduit with three No. 6 wires.

Heater circuit in dining room—Two No. 10 wires in ¾-in. conduit.

¹ Two 3-way switches installed; 1—single-pole only in Red Seal specifications.

² None in Red Seal specifications.

³ One in specifications.

⁴ The contractor is trying to persuade the owner to install two brackets above mantel.

⁵ Two in specifications.

⁶ Two 3-way and one 4-way switches installed; 1—single-pole only in Red Seal specification.

Electragist Reorganizes Obsolete Electrical System in Mill

The accompanying pictures of the meter board and main center of distribution at the mill of the Contractors and Builders Supply Company, Fifth and Kirkham Streets, Oakland, show how effectively the Pacific Electric Motor Company of that city is able to reorganize an electrical system which has become obsolete and unsafe.

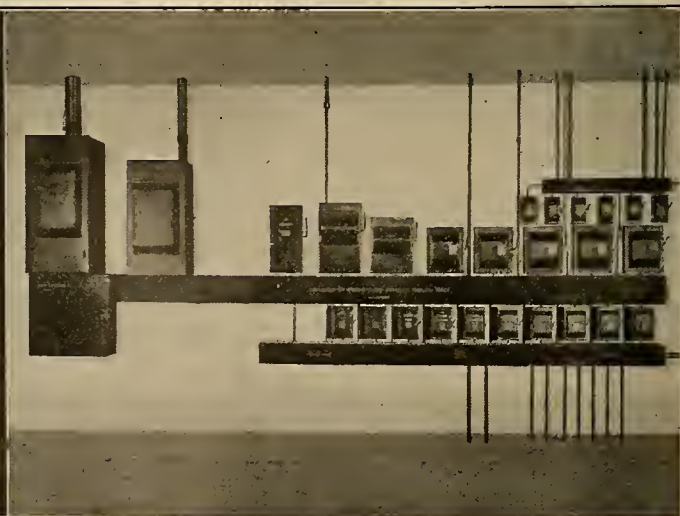
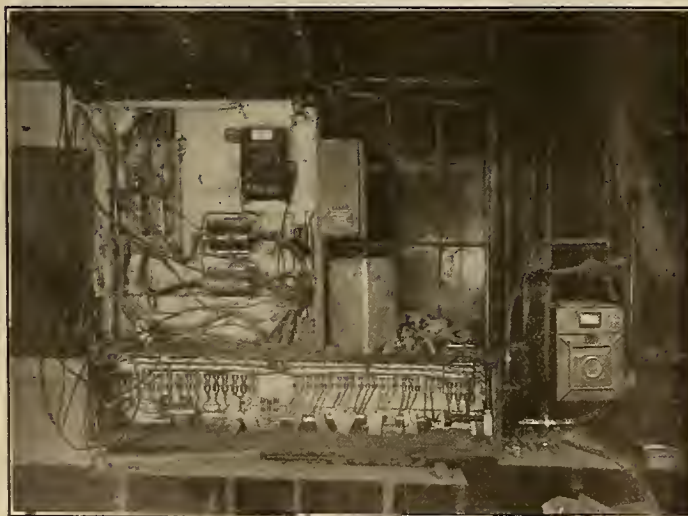
The old board was mounted on wood with asbestos backing, and a trained eye can pick out a number of things at first glance that are wrong; for instance, beside the fuses boxes and open knife switches a gas meter will be noticed. Like many such meters, this one leaked steadily. Moving it to another part of the plant when the board was reorganized was one of the improvements which materially lowered the insurance rate.

The complete change of installation shown by the picture was made without a shut-down of the plant. The new board was put right in the place of the old one with every detail complete.

By the new system of control, any one of the circuits of the twenty motors can be shut off without disturbing the rest of the plant. Trumbull Type "A" switches were used with the necessary wire ways, etc. All the wires are hidden in the new system, and any flash or other trouble also will be enclosed entirely by metal.

The owners of the plant are said to have been so well pleased with the installation and so impressed by the clearness with which the pictures show the improvements that they sent a set of the pictures East to the stockholders.

Outside of its technical features, this job is interesting as an indication of what the Oakland field offers in the way of opportunities.



Left: Picture taken of the meter board and main center of distribution at the mill of the Contractors and Builders Supply Company, Oakland, prior to its reorganization by the Pacific Electric Motor Company. Right: The new board which replaced that shown on the left



Ornamental street lighting on Huntington Avenue, Fresno

Street Lighting Enhances Residential Districts

Fresno Extends Its Ornamental Electrolier System Under Supervision of Department of Public Works

By H. W. STITT, City Electrician, Fresno, Calif.

The extension of electrolier systems to the residential districts of Fresno, Calif., is resulting in its becoming one of the well lighted cities of the Pacific Coast.

There are twenty miles of commercial and residential streets illuminated by single-light standards ranging from 250 to 600 cp. The plans outlined for 1925 will add from three to five miles, and it is expected that the future extension of the electrolier systems eventually will replace the old type of arc and incandescent lamps suspended in the center of street intersections in practically all the better class residential streets.

With the suspended type of street illumination there it has been found difficult to light the sidewalks and even the center of the streets where shade trees are planted along the curb line.

With the modern electrolier system the lights are at an elevation of 12 to 14 ft. to light center.

Good street lighting is a real safety measure. It assists in relieving traffic congestion by providing a well lighted highway where motor vehicles may travel in safety. Good street lighting frightens crooks and criminals working at night; the crook fears light as he would an officer. Night crimes are re-

duced 40 to 50 per cent as a result of well lighted streets.

The present practice in the installation of ornamental street lighting is to assess the cost against the property. This is regarded as an investment which improves property values and affords additional protection.

A well lighted city is a more pleasant residential place, civic pride is increased and the tourist or visitor seeing the lights is impressed at once with the progressive spirit of the city.

In the city of Fresno the details of construction of ornamental street-lighting systems are worked out in the Department of Public Works and maintained by the same department. Each street and lighting district is studied carefully to determine what illumination is required, and lamps are installed accordingly. In the event a brighter illumination is desired it is only necessary to change the lamps to the required size.

New 10,000-Volt Sign Installed for San Francisco Firm

An innovation in sign installations was made in San Francisco recently when a sign which operates at approximately 10,000 volts, was installed for Earle C. Anthony, Inc., at 1335 Van Ness Avenue.

The sign spells the word "Packard" in script lettering. The luminous part of it consists of several gas-filled tubes which follow the lettering and are placed about 4 in. from the face of the sign. The word "Packard" is divided into four circuits, each circuit consisting of one of these elongated tubes. They are as follows: (1) P, (2) ack, (3) ard, and (4) the tail of the d. The border of the sign consists of a similar elongated tube encircling the entire sign, which is approximately 4 ft. high by 12 ft. long.

The current is supplied from two transformers having 110-volt primaries. The transformers are located inside of the building above the door and are enclosed in a metal cabinet.

All of the circuit wires consist of primary cable enclosed in glass conduit. The main body of the sign has a pink-tinged light while the border is violet. The particular feature of the sign, aside from the beautiful coloring, is the fact that the light produced is practically free from glare. The sign and the tubes were made in France especially for Mr. Anthony and were installed by the Pacific Electric Construction Company. A similar installation has been made at the Earle C. Anthony, Inc., branch at Seventh and Olive Streets, Los Angeles.



Left: The 10,000-volt sign installed for Earle C. Anthony, Inc., in San Francisco. The gas-filled tubes which make up the various sections of the sign may be seen in this picture. Right: A night view of the sign

What Is the Future of the Electrical Dealer?

Extract from Paper Presented Before the Annual Convention of the California Electragists

By H. H. COURTRIGHT, President and Manager, Valley Electrical Supply Company,
Fresno, Calif.

Properly to cover this subject—The Electrical Dealer's Future—it is necessary to go back some ten years to the time when the power companies were pioneering in the electrical appliance business.

If some of you will remember back that far, you will recall the big electrical appliance campaigns that were put on at that time. This, you will remember, kept up until about eight years ago, and at that time the power companies of California adopted a new policy. The power companies felt that the pioneering stage of electrical appliance merchandising was over, and it was the policy of most companies to step out of the merchandising business and turn it over to the electrical contractor-dealers, the hardware stores and the department stores.

With this change of appliance merchandising, hundreds of electrical specialty stores sprung up over our state. The contractor-dealer remodeled his store, and the hardware and department stores allotted more space to their electrical appliance department.

The electrical specialty store with its house-to-house salesmen set a pace on electrical appliance merchandising. The contractor-dealer tried to follow that pace, much to his sorrow. Some of you have asked yourselves the question: Why did not the contractor-dealer make a success of the electrical appliance merchandising? My answer to that question is this:

First, the term "contractor-dealer" is a misnomer. If you will analyze these words, "contractor" and "dealer", you will realize that the two words represent different types of men. A man might be a good electrical contractor but if he is, then he will not make a good merchandiser, and vice versa. If a man has merchandising ideas, he will not be gifted also with good contracting ideas. In other words, to make a big success of either it must be in the making of the dealer or merchant or the electrical contractor.

Another point is this: 85 per cent of the contractor-dealers are receiving 75 per cent of their gross receipts from the contracting end of their business, which means that 75 per cent of their time is devoted to that end of the business, leaving only 25 per cent—or less—of the time to be devoted to the merchandising end of the enterprise.

With this in mind, how could the contractor-dealer keep pace with the electrical specialty shop who was putting in 100 per cent of his time to electrical merchandising?

It Just Could Not Be Done

After trying electrical merchandising for a few years, there were a few electrical contractor-dealers who proved to be real merchants. These dealers changed their policy to a straight appliance business. The big majority of the contractor-dealers realized that they were not merchandisers and went back to their old line, that is, you might say, straight electrical contracting with a little retail store doing a small appliance business which helped to pay

the rent on a store that gave a good-looking place of business for the wiring department.

With the power companies building new power plants and doubling their kilowatt-hour output every few years, they found that their electrical appliance or domestic load was not keeping pace with the balance of their load-building, and for that reason, you have heard of dozens of power companies again actively entering the merchandising of electrical appliances.

At this point I might state that my past two years' experience of doing a merchandising business in the lobby of a power company's building has convinced me that the power company's consumers seem to prefer purchasing their electrical appliances from the power company from which they are purchasing their electric energy. To substantiate this statement, the Valley Electrical Supply Company has two stores in Fresno—one in the lobby of the power company building and the other two blocks from that location. Dozens of people have come to its store in the power company lobby and purchased appliances, making the statement that they had seen the appliance on display at the Valley Electrical Supply Company, that is, at the other store, but that they wanted to purchase this appliance from the power company because they knew that the power company was anxious to see that the appliance gave service.

Further to substantiate this statement it might be well to quote a few paragraphs from B. C. Forbes' address before the N.E.L.A. convention held in June in San Francisco. His statement follows:

"Within the last two months I have done something along that line to boost the sale of electric ice boxes for I got orders from headquarters about two months ago that I had to buy 'her' a new electric ice box. There has not been to my knowledge one woman who has come to our house since then who has not been taken into the kitchen and shown the new refrigerating apparatus, and there has not been one who has not indicated there was going to be trouble for her husband when she got home.

"Then we customer-owners can help you—or can at least try to help you—with suggestions. I would like to offer one. I had a feeling I would like to buy my refrigerator direct from the public utility company. I felt that the company would be interested in seeing that it was kept in working order.

"I believe you will have to establish and run, shall I say, electrical department stores for us. We want to do business direct with you and not through third parties.

"Whether we like it or not, all of the present day economic trend is toward big business. The public would certainly rather deal with one party than have to go here and there to deal with people not interested in keeping an electrical apparatus going, and in supplying the juice to keep it going."

It might be mentioned at this time

that in this two years of merchandising in the power company's lobby the Valley Electrical Supply Company never has had a customer come into its store and make the statement that he or she wished the power company to do his or her wiring.

With the power companies actively entering this electrical merchandising business, the question is: "What is the future of the electrical dealer?"

With the power companies stepping into appliance merchandising as they are, in other words, with one branch of the electrical industry stepping out with such strides and working under such policies as they have, it can spell only two words, that is, bigger business. By that is meant bigger business to all those who are engaged actively in the electrical business. These appliance campaigns will create more business for the contractor and electrical dealer, for with everyone in the industry tying in 100 per cent with the power companies in all their campaigns and helping them in every way possible, nothing but success can result. By doing this the contractor-dealers are keeping the electrical business within the four branches, namely: the power company, the electrical manufacturer, electrical jobber and electrical contractor-dealer.

Past history has proved that wherever a power company has put on a merchandising campaign it has stimulated the merchandising business of all the dealers and also has increased their wiring business. When you analyze the campaigns being staged by the Pacific Gas and Electric Company and the Great Western Power Company to sell 6,000 electric ranges between Aug. 1 and Dec. 31, do you realize that these campaigns alone mean \$240,000 in electrical wiring?

In helping the power company put over these contemplated big load-building campaigns it is necessary that the electrical dealers or contractor-dealers adjust their stores and themselves so as better to fit them to take on this bigger obligation that is coming each year. So it would be well to dwell for a few moments on these two points: store display and advertising and illumination.

Store Display and Advertising

The subject of store display and advertising is too large even to attempt in this article. It should be mentioned, however, that you may understand its importance and because there are reasons for an attractive, clean, artistic and neatly arranged store. There should be unity in advertising and display. Windows and advertising should tie in very closely with each other and tell only one story at a time but tell that story well.

A contractor-dealer should spend part of his evenings studying color in the merchants' windows. Every merchant whose store in any way appeals to women has color in his window. It will pay you as electrical merchants or contractors to study these windows and their colorings and assimilate the idea that these merchants are using. Also when looking over these windows notice how many cards with something descriptive about the goods are in the windows. Appealing to women buyers as we are, we also should have cards in our windows that should be lettered neatly telling the story of the usefulness of the various appliances. These

cards describe especially the service of the article and should be brief, containing as a general rule one direct statement because it is only by means of this that the service idea can be put over to the public. These cards should be made by a card designer. Unless they are artistic they will give a cheap effect. Not to have a card in your window descriptive of the article or telling how economically it can be operated is like running an advertisement in a newspaper that consists of a picture and not a single word.

Illumination

Illumination is absolutely essential to contractor-dealer windows. People at night are in a receptive mood. They are out to see and are not worried about business. Every night of the year hundreds of women go window shopping. They are merely strolling from store to store to see what they can see. Women walking to and from theaters and cafes always look at windows. Every window in the retail district should be lighted until ten o'clock or even later. For a merchant to neglect his appeal to the night crowd is unpardonable. During the day electric lights can be used to kill reflections. How many windows have you passed that were only a blur? Have they any value?

An electrical dealer's window should not only be illuminated—it should be the best illuminated window in the city. It should be an example that will give ideas to other merchants who are out looking over windows as well as to the general public. You are selling illumination. If you cannot light your own window properly, who wants your advice on lighting other windows?

Seasonal Tie-in

Whatever appliance you are showing should tie in with the season of the year or with your local power company's appliance campaign. During the month of June, for instance, did any of your windows tie in with the idea of the June Bride? It might be mentioned at this point that the June appliance sales of the Valley Electrical Supply Company were 10 per cent greater in gross than its Christmas month sales. Sales in lamp socket or convenience outlet appliances for the month of June over the counter were more than \$20,000. This does not include ranges, water heaters or heavy-duty appliances. Its merchandising appliance program of sales over the counter on lamp socket or convenience-outlet appliances is \$1.25 per consumer per month, or \$15 per consumer per year. Experience has shown that a special campaign of some home appliances once a month proves very satisfactory, this sale not consuming more than two weeks' time and being put on at a time when most of the employees of your city who are paid monthly receive their pay. This sale seems to put the dealer in the same class as the department store. After putting on a few of these sales, you will find the housewife watching for your advertisements and special window displays and also looking over your showroom display.

Service

Electrical dealers or contractor-dealers are selling a service rather than an article. It is not a washing machine that he is selling but the service that

the machine will render; it is not the wiring job but the service that the wire will perform in the home, office or factory. In connection with this subject of service, the emblem of the Association, "The Electragist," should be used by every member of the Association. This emblem is symbolic of service which everyone knows is essential to success.

In closing, a few words should be said in reference to yourselves as contractors or contractor-dealers. Every electrical contractor or dealer in every city should be interested and take an active part in all organizations and movements that have for their purpose the growth and development of their city. This work has a very definite effect on his business. First, the larger his city becomes, the more business there will be for him to do. As he moves and works among his fellow men, the better known he becomes. The more intimate his activities become connected with those tending to make the city grow and become prosperous, the more often his name appears in the newspapers and more people come to know of him by reputation. This advertising is of the highest value, for the public thinks of its prominent men as reliable and worthy of confidence.

A study of the leading merchants of your city will convince you of the fact, and what is good business for them is good business for you. Many contractors and dealers have realized that important fact. More should. It will pay you to help your city become bigger and better and to associate yourself with its leaders. The electrical industry must be a unit in telling the electrical story. The electrical business is growing so rapidly from year to year that it is requiring more cooperation between the different branches of the business than ever before so contractor-

dealers should get behind these big merchandising campaigns in a way that they never have before and make them a bigger and greater success than is expected.

The future of the electrical dealer is in his own hands. If he, the electrical dealer or contractor, only will take advantage of the opportunities before him, he will grow and prosper with the other branches of this great electrical industry.

Safety-First Installation for the Electrical Contractor

The Sept. 1 issue of the Journal of Electricity (p. 179) contained a discussion of a typical installation of a number of motors with various capacities, both large and small but all within sight of the operator. This was the fourth of a series of five which will show five different types of installations commonly made by the electrical contractor. The present discussion is the concluding installment in this series.

Fig. 5 shows a motor installed out of sight of the incoming fusible switch but with the starting equipment in sight of the motor. It will be noticed that the service enters a basement or pit and comes directly to the fusible disconnecting switch just ahead of the meter box, thence to the starting equipment located on the same floor as the motor equipment and in plain sight of the operator. In an installation of this type it is not necessary to have a non-fusible disconnecting switch in order to work on the motor.

Another point shown in Fig. 5 is the flexible conduit used for connecting from the conduit service to the motor, enabling the operator to slack off or take up on a belt drive.

The five installations discussed in this series cover the average job very well.

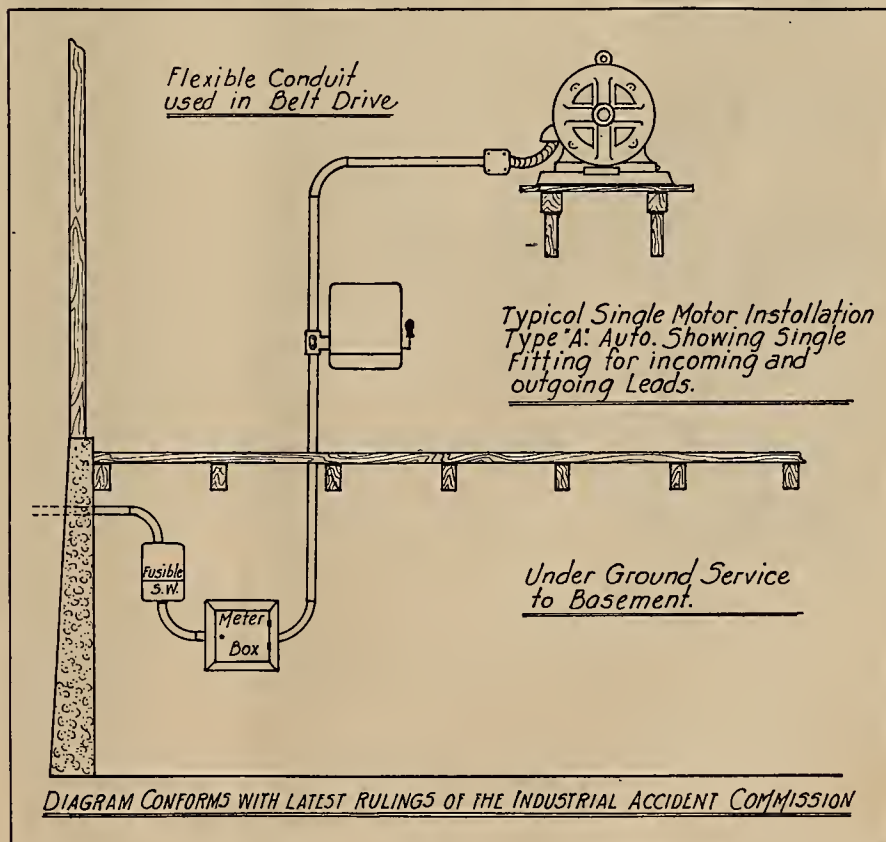


Fig. 5

BETTER MERCHANDISING

Selling the Electric Range

By W. T. RYAN*

Commercial Department, Washington Water Power Company, Spokane, Wash.

Lord Nelson was a salesman. He sold himself and his ideas to the British navy, and through the officers and sailors, to the British public. By performance, not merely by words, he gained the popular confidence to such an extent that the Admiralty had to appoint him commander-in-chief of the British fleet during the series of naval manoeuvres that culminated in the battle of Trafalgar where Nelson sealed his work with his own life. Waterloo and the downfall of Napoleon were the inevitable consequences of Trafalgar.

And Nelson followed a system—a theory of naval strategy and tactics so clear and simple that he had no diffi-

sequence of steps. In making the "approach" and in securing the "attention" of the prospect the salesman runs up against a lot of objections. These must be overcome. On the diagram they are indicated by small arrows pointing to the left, the progress of the sale being indicated by the large central arrows pointing to the right. Look at the diagram as you read this. In overcoming the objections at the start you can undoubtedly convert some or all of them into arguments in favor of the sale. For example, if wood fuel is used, you can emphasize the steadily rising prices which offset any fancied economy in its use.

If you have overcome these objections, you have certainly won the "Attention" of the prospect, and then you arouse his "Interest" by selling the idea of electric cooking. Now the arrows are all pointing toward the bullseye. Every argument on the diagram strengthens your case. Then, having sold "Electric Cooking", you determine by a few rapid questions just the particular type and style of range your customer needs or desires, and you proceed to sell him that, and only that. Note the diagram says "Selling the Range", not "a" range. Now you watch your customer for the points that impress him most, and you play up those points. At this stage you are building up "Desire", and you should give free rein to your own enthusiasm, because that will become contagious. Once your own enthusiasm and conviction is caught, your customer has the "Desire". Now for "action"—the "close".

Here for the first time you will have to talk money, terms, and credit for old range, the last kicks and squirms of the customer. It is a mistake to talk these points at all before you have built up the idea of value and created "Desire". If the preliminary work shown on the diagram has been properly done, you have created "Desire", and made "Action" inevitable. In other words, you have gained sufficient momentum to carry you safely across the last few objections and make your sale. Your customer can do nothing but make his payment and "Sign Here".

In dealing with a customer, one of the really important things to keep in mind is the necessity of controlling the conversation at all stages. The strong-minded customer is apt to seize upon some side issue and confine the subsequent discussion to it. The salesman must be sufficiently aggressive and tactful to break off such a discussion and get back upon the main line. This chart gives a well defined framework on which to hang all of the sales talk. The

successful range salesman may find it of interest. If, however, he is selling ranges, he has a system and doesn't need help. The chart and this discussion is intended to help the salesman who feels some misgivings as to his own ability to sell ranges. If he has no definite system, if he sees his sales break down at certain points, this information may prove helpful. It is at any rate a system and will be better than none at all.

Electrical Idea Taught at New Kerman Union High School

When the "young idea" is an electrical idea, who can tell what electrical homes will be demanded in the near future? Already efforts in the education of the so-called "young idea" at Kerman, Calif., are beginning to bear fruit. And this is because the new Kerman Union High School has been



How the "young idea" is being educated to the benefits of electric cooking and housekeeping in the new Kerman Union High School of the San Joaquin Valley

electrified completely and those taught in it are taught electrically in so far as possible.

Electrification of the Kerman High School was uppermost in the minds of the architects and builders when it was erected about a year and a half ago at a cost of \$225,000. While it is not completely equipped at the present time, arrangements have been made to add to the electrical equipment from time to time as the need arises.

The domestic science department has received particular attention. The rooms are well lighted, both by daylight and artificially. Six 4.66-kw. ranges are at the disposal of the domestic science classes. A 5-kw. water heater with a 30-gal. tank furnishes hot water for the department. An electric sewing machine, irons and smaller appliances are included in the equipment.

A lunch room is operated in connection with the domestic science department, the food being prepared on the ranges in the domestic science department.

In the gymnasium hot water for shower baths is drawn from three tanks

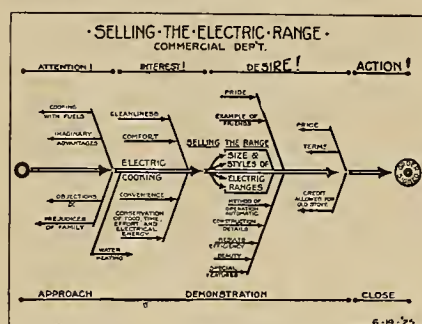


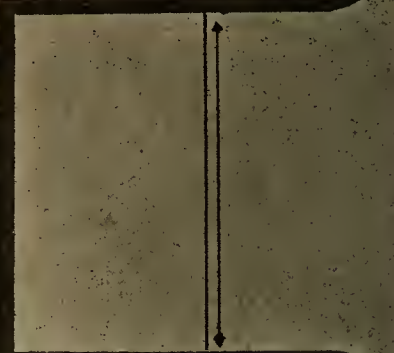
Chart used by The Washington Water Power Company in connection with its sales letter addressed to employees engaged in selling electric ranges

culty whatever in impressing the principles upon all of his officers. It was not hit-or-miss fighting but cold-blooded reasoning backed up by nerve and determination that made Nelson and the British navy invincible.

Nelson never heard the word "salesman". He understood "sails" not "sales", but the ideas of system that he developed in his work are of great interest in modern sales work. The salesman who adopts a plan and develops a method for effecting his sales is sure of success, and the principles that underlie the sale of automobiles, or guns, or jewelry, or cash registers apply with equal force to electric ranges.

In order to give a picture of how the electric range is sold, the accompanying diagram has been worked out. It shows a method of attack, the range prospect being the victim and the signing of the order the bullseye. In analyzing any sales of ranges that the reader has made in the past he will realize that consciously or unconsciously he followed this method and probably the same

* A salesman's letter prepared by Mr. Ryan to outline to employees selling electric ranges the principles of salesmanship, especially as applied to electric range sales.



INTERIOR of the Electric Appliance Shop, Los Angeles, which by its neat appearance convinces the customer of the quality of the merchandise. Appliances neatly arranged in glass-enclosed wall cases save space and display the merchandise attractively. Wall stock bins used for package merchandise keep the goods within easy reach and increase the efficiency of the sales force. Special displays are made on floor racks, and a desk is provided for the convenience of customers. All floor cases have glass tops permitting the display of the entire contents. Large appliances are shown in the rear of the store behind the posts.



Retail Stock is Turned Sixteen Times Each Year

Gross Business of Over \$100,000 Per Year Is Recorded by The Electric Appliance Shop of Los Angeles

By G. W. BARKER

A. W. Gonnerman, proprietor of The Electric Appliance Shop, Los Angeles, seems to have solved the problem of merchandise turnover. This problem always has confronted dealers in all lines of business and particularly those engaged in selling electric appliances. Many have tried to increase their volume by taking on other lines, and others have adopted the expedient of making their stores exclusive appliance emporiums. Still others have made their businesses a combination of merchandising and construction effort and have divided their time and attention between the two interests. Mr. Gonnerman has done none of those and yet has done all.

Starting shortly after the World War with a capital of \$1,200 and a comprehensive knowledge of merchandising principles and of electric appliances, in a store 20 x 30 ft., he has expanded gradually until he now occupies a place 100 x 40 ft. The volume of business has increased steadily and has been developed along sound merchandising policies. Cut prices and startling feature sales have been carefully abstained from. Sales volume has been built up by store sales alone, and the use of house-to-house salesmen has been avoided.

The merchandise handled includes everything electrical that may be applied in the home. A large part of the store is devoted to the display of washers, and these are sold on the usual time-payment basis when the purchaser so desires. This term-payment business has been handled in a way that has been found to be more profitable than usual and the net credit collection losses for the entire business have averaged less than one-half per cent per year. This has been accomplished in part by the fact that credit is extended only to persons of known responsibility or to those with sufficient credit references and also to the fact that open book accounts are collected within sixty days. No account, other than lease contracts, regardless of the firm or individual, is allowed to extend beyond the established limit. Collections on lease contracts are made promptly, and payments are not allowed to lag. Whenever an account becomes delinquent without reasonable excuse a courteous but insistent letter is sent by registered mail and a return receipt is required.

Bookkeeping is done by means of a bookkeeping machine, and a statement of accounts is made up each day. There is prepared daily a statement of condition. This work is so simplified and systematized that it takes not more than an hour and a half of time and the finished statement is ready by the middle of the forenoon.

It was decided early in the history of this business that no effort would be made to engage in house wiring. General conditions in this field of the industry seemed to promise less return for the investment and to involve greater hazard than did the merchandising of appliances. Therefore, the only wiring done by this firm is that

for offices, stores and general commercial concerns. All wiring is done on a time-and-material basis. Each job, therefore, must show a profit. A small wiring crew is maintained continuously and is supplied with an automobile. This crew is able to function with exceptional efficiency on account of the fact that it has developed the spirit of team-work, always has work before it and is not confronted with the possibility of unemployment. No effort is made to take on more work than can be handled properly by the regular organization.

In the sale of appliances Mr. Gonnerman decided to stay with the well known and advertised lines. No departure has been taken from this decision, and a pleasing volume has resulted. Recently, owing to the quality of service rendered by this store, it has been appointed southern California service station for one of the well-known lines of domestic appliances.

Appliance repairs, which always form a part of every dealer's business and which have an important bearing on his relations with his customers, are handled in an unusual way. A separate repair department is maintained under the charge of a competent appliance man, and none but the appliance repairman is allowed to quote on repairs. This centers the responsibility for the repair and for its cost and avoids all possibility of misunderstanding. The repair departments has been so conducted that it has made many friends for the store and has brought many sales that otherwise doubtless would have been lost. It always has shown a reasonable profit.

Genius has been described as "an infinite capacity for taking pains." If that is true it would seem that this store has been run by a genius for it is evident throughout the store that no care is too great to be taken in rendering service to customers. In order to save the time usually taken up in making change a pneumatic tube has been installed, connecting the various sales counters with the cashier's office. By the use of this tube system the money and sales check are conveyed to the cashier and change is made and returned while the customer's package is being wrapped. In addition to saving the time of purchasers this system also saves time for the clerks and makes it possible to handle the business of the store with a smaller force than otherwise would be necessary.

Window displays always have received the greatest consideration. No window dressing is done without a definite idea as to what merchandise is to be featured, and the arrangement is made with a careful regard to the most effective display possible. Radio has played a prominent part in the sales development of the store, and this line of merchandise is growing more rapidly than any other. For that reason one window always is given over to the display of radio sets and parts, and the latest equipment is given the most prominent place in the window. The

other window is used for appliances and labor-saving devices. New appliances are featured in a conspicuous manner.

All merchandise arriving at the store is checked in by a stockkeeper and is checked out when it is removed from the stock room. The stock record shows what disposition was made of the goods, whether taken into retail stock, delivered to consumer or returned to shipper. These stock records at all times constitute a record of stock on hand and make easy the taking of inventory. All stock bins, both in the stock room and in the store, are labeled and only one item is kept in a bin. In the lamp department this is of special assistance to the sales force as it enables them to select a lamp with assurance that it will be of a voltage or wattage in accordance with the label on the bin. An original and unique lamp tester has been designed and made in the store. This permits of the testing of single and double contact automobile lamps, flashlight lamps and batteries. When a customer brings in a flashlight and says, "I don't know whether it is my lamp or my battery," it is a simple matter to determine in a few seconds which is at fault.

Extension cords in all the usual sizes are made up complete and are packed in pasteboard boxes. This makes them easy to handle and easier to wrap, keeps the stock neatly assembled, makes a handy package for the customer, and creates a favorable impression. The cost of the boxes for this purpose does not exceed two cents.

All employees work on a monthly salary. At the end of the year there is a division of the profits of the concern, after due reserves have been set aside for expansion and development. This gives every employee a personal interest in the business and an incentive to develop the spirit of the organization—service. This business has been built up by fair dealing; by close attention to the demands of the customers; by rendering a service beyond the mere exchange of money for merchandise; by conservative buying and by stimulating turnover.

By means of the careful records kept and by conservative buying the stock turnover in this store has been brought up to an average of sixteen times a year.

For the convenience of prospects and customers a small space in the store has been rented to a sewing-machine manufacturer for the display and sale of electrically operated domestic sewing machines. Very often people who have come into the store merely to see sewing machines are attracted by the display of other electrical merchandise, and sales are thus made that otherwise would have been lost. The same thing happens in the case of a dealer in therapeutic instruments, who has leased a small portion of the store; doctors who have come in to buy medical apparatus have gone out with many dollars worth of electrical appliances, lamps and other devices. The patronage of the medical profession has grown to marked proportions, and this growth has been assisted in part by clinics that have been held in the store for the demonstration of therapeutic apparatus.

NEWS OF THE INDUSTRY

Western Power Corporation Acquired by North American Company in Recent Deal

In the limelight not long ago because of its purchase of the San Joaquin Light & Power Corporation and the Great Western Power Company of California, the Western Power Corporation itself was acquired recently by the North American Company of New York, according to an announcement made to the press by H. P. Wilson, president of the Western Power Corporation. Thereby, control of the Great Western Power Company of California and the San Joaquin Light & Power Corporation also will be transferred to the North American Company, a large holding company whose principal properties are centered about St. Louis and adjacent country.

The basis of the acquisition proposed, and which was expected to be carried through, included an exchange of Western Power Corporation common stock for North American common stock, at the rate of $1\frac{1}{4}$ shares of North American for 1 of Western Power. Western Power stockholders are to be given the option of taking cash at the equivalent of \$75 a share. This plan, according to Mr. Wilson, has been approved by a substantial proportion of the stockhold-

ers of the Western Power Corporation, to whom it has been submitted. Western Power's common stock outstanding consists of 219,200 shares of no par value, of which 72,500 shares were issued to stockholders of preferred and common stock of the company in January, this year, at \$35 a share. There also is outstanding 70,800 shares of 7 per cent cumulative preferred stock of \$100 par value.

The Western Power Corporation is the holding company for the Great Western Power Company of California and the California Electric Generating Company, and early this year acquired the San Joaquin Light & Power Corporation and its subsidiaries, the Midland Counties Public Service Corporation and the Fresno City Water Corporation. (Journal of Electricity, Dec. 15, 1924, p. 454.) The Great Western Power Company and California Electric Generating Company serve in sixteen counties in California, included in which are the cities of San Francisco, Oakland and Sacramento. The aggregate earnings of the Western Power Corporation's companies are in excess of \$17,000,000 annually.

Los Angeles Division General Electric Plans New Buildings at Vernon

The General Electric Company is to begin work immediately on a large warehouse and an office building on a five-acre site of ground at Santa Fe Avenue and East 52nd Street, Los Angeles. Present plans call for the immediate expenditure of approximately \$300,000, but it is expected that fully

\$1,000,000 will be expended on this plant eventually.

The warehouse, which is to be a three-story structure, 80 x 240 ft., is to be so built as to permit the addition of two more floors as the necessity for more space grows. The office building will be a two-story structure containing

16,000 sq.ft. of floor space. Both structures will make use of the very latest electrical equipment. The office building will be heated electrically.

The Austin Company of California designed the structures and are to be in charge of the work. The Newbery Electric Company has been awarded the wiring contract.

Transmission Line Contracts Let by Edison Company

Contracts for towers, conductors and insulators for the 220-kv. Vincent line of the Southern California Edison Company have been awarded. The tower contract was divided between the Pacific Coast Steel Company, San Francisco, and the Newport News Shipbuilding & Dry Dock Company, Newport News, Va. Conductors will be supplied by the Aluminum Company of America, Pittsburgh, Pa. Insulators will be furnished by the Westinghouse High Voltage Insulator Company, Emeryville, Calif.

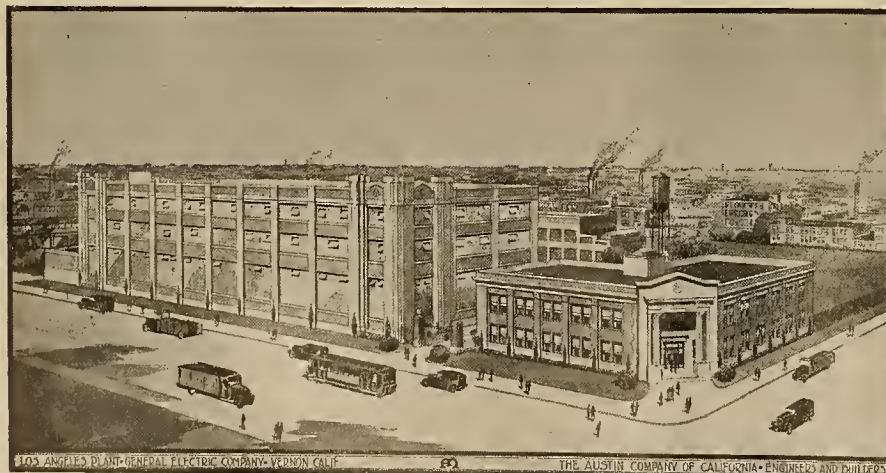
The line, on which construction began Sept. 1, will be the third 220-kv. transmission line leading from the Edison company's plants in the vicinity of Big Creek, Fresno County, Calif., to southern California. The new single-circuit line will connect Big Creek 3 and Crescenta switching station, near Laguna Bell substation, southeast of Los Angeles. It will be 223½ miles in length.

About 800 towers will be furnished by the two successful bidders. The Newport News Ship Building and Dry Dock Company will supply approximately two-thirds of the standard 60-ft. towers and the Pacific Coast Steel Company will furnish the special towers and one-third of the standard type. The maximum working tension on the line is to be approximately 36,000 lb. The tower contracts call for about 6,000 tons of steel.

The contract for conductors for the line was secured by the San Francisco office of the Aluminum Company of America and calls for 680 miles of 1,033,500-circ.mil concentrically stranded steel reinforced cable, consisting of seven central strands of steel and fifty-four strands of aluminum. This cable will weigh approximately 7,030 lb. per mile of wire and will have an outside diameter of 1.247 in. Deliveries are to be in four equal portions, the first to be made the latter part of the present year and the last early in 1927.

All of the insulators for the line are to be manufactured in the Emeryville plant of the Westinghouse High Voltage Insulator Company.

Pacific Coast Electrical Association Moves.—The Pacific Coast Electrical Association recently announced the removal of its offices from the Rialto Building, San Francisco, to 447 Sutter Street (Rooms 729-730), that city.



Architect's drawing of the proposed new warehouse and office buildings to be erected in Los Angeles for the General Electric Company, southern California division

Industrial Lighting Activity Plan Book Prepared by Lighting Committee

The Industrial Lighting Committee of the National Electric Light Association, which is conducting the Industrial Lighting Activity, has prepared a Plan Book which offers "a complete plan of organization of local communities for the operation of a nation-wide campaign to increase sales and profits on industrial lighting installations."

In addition to formulating the complete plan, the Industrial Lighting Committee will carry on a campaign of industrial lighting advertising in national, business, management and class magazines; will furnish sales, lectures and advertising suggestions to assist local groups in carrying out their campaign, and will provide salesmen to explain the activity and assist in organizing the local groups. The Plan Book points out that the national campaign is the first half of the activity but that it will be of little avail if the electrical interest of the town or city do not follow the plan and carry out the second half of the activity. The local community need not follow all of the steps laid down by the Industrial Lighting Committee, but should formulate some plan that will fit the needs of the locality best.

The plan, as outlined in the Plan Book, covers a direct-mail campaign, tied in with the national advertising campaign; a newspaper advertising campaign; a lighting demonstration; a motion picture film, "Productive Lighting in Industry", to be shown at meetings of Chambers of Commerce, Rotary Clubs and similar organizations; trial installation; industrial lighting talks, and industrial lighting schools. Suggestions are made for the use of the different campaigns, for the making up of lists, and for followups. Forms for making factory layouts and for the obtaining of field notes of an industrial plant by local communities will be provided by the Industrial Lighting Committee. The Brayton portable projector, 10½ in. high and weighing 4 lb., which may be carried in a brief case, is suggested for use with the film instead of a lantern-slide projector.

Three typical local plans are given, one as proposed by the Edison Electric Illuminating Company of Boston, one by the Cincinnati Electric Club, and the third by the Cleveland Electric League. The book also contains three broadsides, sample invitation to demonstration and order blanks for material.

In order to stimulate the local groups in the activity, the Industrial Lighting Committee is offering three prizes based upon the work done and the accomplishments of the individual committees. These prizes are: first, \$2,500; second, \$1,500; and third, \$1,000. They will be awarded upon: 1—The percentage of factories in communities brought up to a higher standard of lighting by the activity in the period of the Industrial Lighting Committee's program from Sept. 1, 1925, to March 1, 1926; 2—The excellence of the report based upon its value to the rest of the industry in facts and figures; 3—Evidence of an educational activity to industrial plants, civic and business groups on industrial lighting economies; that is, increased production, decreased spoilage, fewer accidents, less labor

turnover. The prize money will be given to the local electrical league or local organization conducting the activity to be used in any manner it sees fit. All reports must be in the hands of the Industrial Lighting Committee, National Electric Light Association, 29 West 39th Street, New York City, by April 1, 1926.

The Plan Book lists the geographic chairmen who will handle the activity throughout the country, and the territory covered by each division. In the West these are: Rocky Mountain Division—C. E. Addie, Public Service Company of Colorado, Denver, the states of Colorado, New Mexico and Wyoming; Northwest Division—J. F. Orr, Idaho Power Company, Boise, the states of Idaho, Montana and Utah; H. J. Gille, Puget Sound Power & Light Company, Seattle, the states of Oregon and Washington; Pacific Coast Division—A. M. Frost, San Joaquin Light & Power Corporation, Fresno, Calif., the states of Arizona, California and Nevada.

The New Service Department of Westinghouse at Emeryville

What is claimed by the Westinghouse Electric & Manufacturing Company of East Pittsburgh to be one of the largest and best equipped electrical repair shops west of Chicago is its San Francisco service department, which occupies the front section of the new Westinghouse Building in Emeryville, Calif.

This building is a three-story structure of the most modern type. All the side walls and the roof of the center bay are glassed in so that the entire interior is flooded with sunlight. Ample room for future expansion has been provided for, as the company owns a large tract of land between this new building and the plant of the Westinghouse High Voltage Insulator Company. The building was designed to serve as the Pacific Coast distributing point for the East Pittsburgh works. A large section of it will be occupied by the as-

sembly department. Another wing will be devoted to the zone warehouse stock.

The service department is well equipped to handle all kinds of electrical repair work, large and small. Many of the processes, insulating materials and varnishes used at East Pittsburgh are employed in this department to insure the best possible results.

Special care is given to coil winding and impregnation. Three automatic electric bake ovens are installed for baking out coils. A 150-ton hydraulic press is used for pressing large rotors on and off shafts.

The machine shop at one end of the main aisle has all the usual machines, with special machines for key-seating pulleys and babbitting bearings. Traveling cranes facilitate the handling of all apparatus in the shop.

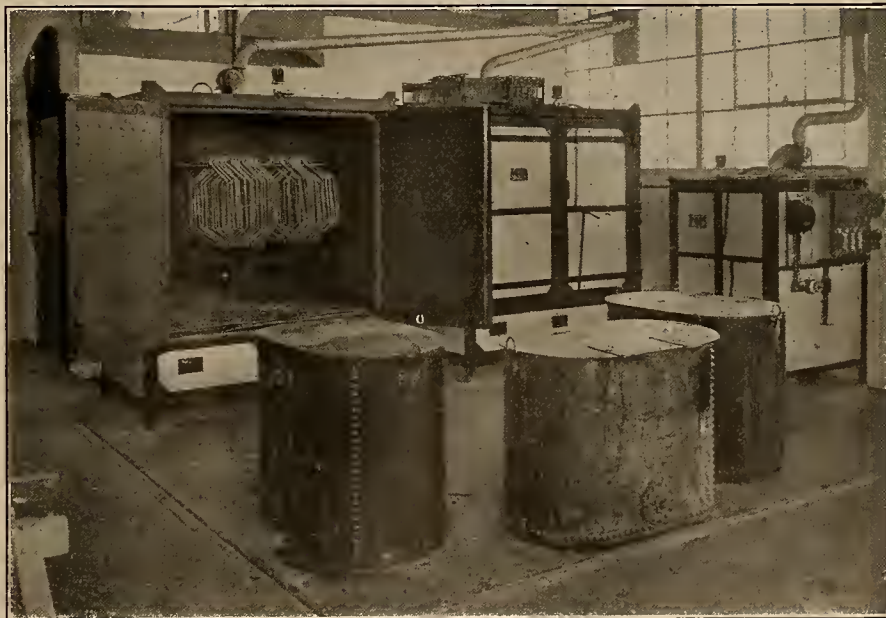
An elaborate test switchboard enables the operator to determine several important factors simultaneously when testing apparatus. A portable testing set is arranged for general shop use, but as far as possible all apparatus is given running tests and final inspection at the main testing switchboard.

The switchboard manufacturing department is located on the second floor. Long racks are provided for the assembly of large power switchboards, while small panel boards and automatic control equipment of all kinds is assembled at the benches. The switchboard department has its own designing engineers and draftsmen.

The steam division does most of its steam-turbine repairing and reblading on the job, but some classes of mechanical repairs are handled at Emeryville.

The facilities of the service department will be increased as the needs of the future demand.

Utah Town Contemplates Whiteway Lighting System.—The town of Payson, Utah, is contemplating the installation of a new "Whiteway" lighting system. Bids have been called for, and it is expected that work will begin in the near future. The initial installation will cover four blocks on Main Street, with ten metal standards to the block.



Three automatic electric bake ovens and coil-dipping tanks form part of the equipment in the Westinghouse Electric & Manufacturing Company's service department at Emeryville, Calif.

Manufacture of Gas Controlled by Electrical Device

Oddly enough, electricity plays the role of gas-maker as a result of a recent improvement in gas-making machinery, which allows an electric motor to serve the purpose of an operator. Such an electrical automatic control system has just been installed on the new oil gas set recently completed by the San Diego Consolidated Gas & Electric Company. The new gas generator has a capacity of 5,000,000 cu. ft. per day.

As shown in the accompanying photograph, a small electric motor is used for



Electrically operated automatic gas-making control system recently installed by the San Diego Consolidated Gas & Electric Company.

motive power for the automatic control mechanism. Making gas requires a series of timed operations in certain prescribed order. In the past this has required an experienced operator.

The new mechanism, manufactured by the Gas Machinery Company of Cleveland, is actuated by a series of cams, arranged to rotate on a shaft driven by the electric motor. The speed of the shaft is regulated by means of gears. As the shaft rotates, each cam in its proper turn opens the corresponding control valve, causing the particular operation it governs in the manufacture of the gas to be accomplished. Optional manual controls are also provided as auxiliary, the whole control board occupying a small space and making a neat appearance.

S.E.D. Inaugurates Publication of Another News Service

The first issue of a new monthly news service to newspapers, devoted entirely to the subject of city delivery and materials handling methods, recently was released by The Society for Electrical Development. This service, supplementing the society's weekly news service, now being sent weekly to approximately 800 newspapers reaching more than 29,000,000 readers, will be sent to the same list of newspapers. It will contain extracts from current maga-

zine articles and other data regarding the use of electricity in the field of city transportation and delivery and in the handling of commodities at ports and terminals, loading platforms and factories. The first issue contains four full newspaper columns.

This latest service to newspaper editors probably will be developed into an industrial news service covering the application of electrical service for industrial and commercial purposes. The weekly news services contain chiefly information concerning the use of electricity in the home.

Developed in connection with the electric truck business development program, which the society is carrying on in cooperation with the manufacture of electrical trucks, batteries and accessories, this service will be sent also to twenty news syndicates serving several hundred newspapers each.

Changes in Personnel Announced by Edison Company

The department of substation operation of the Southern California Edison Company, Los Angeles, has been reorganized. According to a statement by L. L. Dyer, superintendent of substation operation, the present divisional territory is too large to be covered by three divisions, and consequently a fourth, to be known as the southern division, has been created. A. P. Sessions, formerly assistant to the substation engineer, will be in charge. The eastern, western and northern divisions are under the supervision of R. W. Graves, M. C. Hilliard, and J. B. Witte, respectively. The latter until recently was equipment supervisor of the northern division of the protection engineering department of the company. All division headquarters will be located in the Edison Building, Los Angeles, with the exception of the northern division, which is located at the Edison office in Visalia.

The Edison company also has made a change in its distribution department. L. W. Thompson, formerly superintendent of the coast division of that department, has been appointed material engineer to represent the operating department at the general store. His successor is J. F. Hodges, who was formerly superintendent of the Long Beach district. Under Mr. Hodges' supervision will come the distribution department of thirteen districts, including all those between Huntington Beach and Santa Barbara.

Westinghouse Company Compiles Data on Development of Electric Locomotive.—A reprint of a paper on "The Development of the Electric Locomotive" originally presented before the meeting of the American Railway Association at Atlantic City in June, 1924, has been completed by the Westinghouse Electric & Manufacturing Company. The paper comprises twenty pages of descriptive matter pointing out the salient facts incident to electric locomotive progress. A valuable supplement contains two large charts compiled from electrical and mechanical characteristics of all a.c. and d.c. electric locomotives in operation in this country and abroad. These charts in themselves are most complete and accurate and will provide a ready reference to any one interested in this type of motive power.

Applications for Water Rights Increasing in California

An interesting situation with regard to water matters in California, particularly with reference to the number of applications for water appropriation, is revealed by the report of Edward Hyatt, Jr., chief of Division of Water Rights, State Department of Public Works, for the year 1924.

In 1914, when the office was opened, five applications were received; in 1924 the number was 631. During the first four years applications were received at an average yearly rate of 285; from 1920 to 1923 the rate increased to 542; and in 1924 the total received was 89 more than the average of the preceding four years and 64 more than in any preceding year of the history of the office.

A total of 635 applications were disposed of, 371 by approval and 264 by cancellation. The applications approved proposed the appropriation of a total of 27,907 sec.-ft. and 1,627,010 acre-ft. of water per annum. Of this 1,409 sec.-ft. and 133,243 acre-ft. were for agricultural purposes; 26,368 sec.-ft. and 1,491,767 acre-ft. were for power purposes; and the remainder for mining, municipal and domestic uses. Of the permits issued, those given to the Southern California Edison Company, Los Angeles, for its proposed Big Creek project on San Joaquin River cover the largest single development. This project contemplates the development of an ultimate total of 1,495,500 hp. and the utilization of the regulated flow of approximately 7,700 ft. above sea level and a lower elevation of approximately 1,000 ft. above sea level.

During 1924 progress was made toward the completion of adjudication proceedings on eight different streams, those relating to Hat Creek in Shasta County and Oak Creek in Inyo County having been completed and decrees entered.

Manufacturer of Scientific Instruments Issues General Catalog.—Adam Hilger, Ltd., 75a Camden Road, London, N. W. 1, has issued recently a general catalog covering its complete line of manufactures. The book is divided into sections, which are tab-indexed as follows: B—Echelon diffraction grating and Lummer-Gehrcke parallel plates; C—spectrometers and goniometers; D—wavelength spectrometers, monochromators and specialized spectroscopes; E—spectrographs; F—accessories; H—spectrophotometers, colorimeters, etc.; K—diffraction gratings; L—micrometers, etc.; M—polarimeters and refractometers; N—interferometers; O—spectroscopic apparatus; P—optical work; R—Low-Hilger audiometer. There are also an index of sections and a general index. The catalog contains much detailed data and is profusely illustrated.

Circulars on Foreign Electrification Issued by Department of Commerce.—The Department of Commerce, Bureau of Foreign and Domestic Commerce, Electrical Equipment Division, has issued circulars on rural electrification in foreign countries as follows: No. 295, Denmark; 297, New Zealand; 300, Italy; 301, France; 307, Sweden; 308, The Netherlands; 309, Great Britain; 311, Germany; 323, Finland.

Denver Electrical League Issues Fourth Annual Report

The fourth annual report of the Advisory Board of the Electrical Cooperative League of Denver recently has been published in pamphlet form. Among the subjects covered are: Purposes of the Electrical League; Organization and Operation; The Advisory Board, Officers and Staff; A Retrospect of Four Years; Condensed Financial Report; Field Work as an Educational Medium; Home Lighting Essay Contest; Denver's Third Electrical Home; Publicity and the Printed Word; Christmas Campaign and Holiday Lighting; A Glance at the Social Side; Miscellaneous Activities, which include Information Bureau, Improved Wiring Rules, Outside Meetings, Lighting Demonstrations, Radio and Weekly Bulletins; Plans for the Fifth Year, and Summary.

The report shows that for the four years of its existence the League has had a total income of \$53,674.92, and that the actual expenditures for that period have been \$53,028.95. For the year ending June 30, 1925, the total income amounted to \$14,080.15, and the total disbursements to \$13,434.18.

The League has found field service work a most effective means of carrying the electrical message to the public, and as a result of this work and the related activities its records show the addition of 8,944 outlets, of which 2,822 have been installed on 140 completed jobs, the remainder being additions to work contemplated or actually under construction but not completed at the close of the year.

According to the plans adopted by the Advisory Board for the new fiscal year, July, 1925-June, 1926, inclusive, all of the major activities in which the League has been engaged are to be continued, with emphasis on business building operations. The principal items of the program committee report adopted follow:

Membership—To secure membership in pledges for the coming year and to collect any and all outstanding subscriptions as soon as possible in order that the work of the new year will not be hampered.

Financing—To confine activities as permitted by the budget, and in order to insure the complete program, to secure as much financial assistance as possible and to keep expenses at their present low minimum.

Attendance—To insure and increase attendance at Board meetings, and other gatherings, by impressing the responsibility upon company executives because of the tendency to delegate matters of this nature.

Entertainment—To give more consideration to the social or entertainment phase of the program by charging the entertainment committee with added responsibilities, including that of arranging meetings when any distinguished member of the industry is visiting in Denver.

Constitution—The consideration and formulation of a constitution or more definite set of working rules provided there is a definite desire for such action as ascertained by the special committee appointed for this purpose.

Dealer Aid—To recommend seasonal merchandising campaigns but only to give such assistance as might be desired and requested by dealer members.

Electric Homes—To confine electrical home exhibitions to one a year unless arrangements can be made whereby other interested parties will assume the burden of expense in which case additional demonstrations might be considered and approved.

Red Seal Plan—To inaugurate a Red Seal activity after complete information has been obtained and definite plans outlined for its successful operation and financing over an adequate period.

Budget—The total budget \$12,500.00 to remain the same as last year.

Officers elected for the fifth year are:

Chairman—A. C. Cornell, manager, Western Electric Company; vice-chairman—W. A. J. Guscott, Electragist; vice-chairman—E. P. Kipp, western sales manager, Hazard Manufacturing Company; vice-chairman—F. F. McCammon, power sales engineer, Public Service Company of Colorado; secretary—E. A. Scott, Scott Bros. Electric Company; treasurer—D. D. Clark, Denver Commercial Manager, Mountain States Telephone & Telegraph Company.

Reduction in Rates Announced by Utility of Longview, Wash.—The Longview Public Service Company, Longview, Wash., announced new rates, effective Sept. 1, effecting a reduction of 15 per cent in residential lighting, and the same reduction for the primary rate up to and including 100 kw-hr. in commercial lighting. The residential rate was reduced from 10 cents to 8½ cents per kw-hr. for the first 60 kw. used, and the commercial rate was cut to the same figure on the first 100 kw. used. The company has had an increase of 40 per cent in the total number of customers in the past six months.

Time Extension Granted Aberdeen in Hydroelectric Project

Announcement that he has granted the city of Aberdeen, Wash., an extension of time until Sept. 1, 1926, in which to begin construction on its proposed hydroelectric development and city water system on the Wynooche River in Grays Harbor County was made Aug. 28 by R. K. Tiffany, state supervisor of hydraulics. The announcement is tantamount to a victory for the city of Aberdeen in the battle which it has been waging for virtually two years in an endeavor to obtain extension of the time limit within which the city must begin construction work on its proposed \$2,000,000 hydroelectric and municipal water development.

In announcing granting of the extension Mr. Tiffany stipulated that the city of Aberdeen must proceed with reasonable diligence in carrying on the proposed construction work. The decision provides that actual construction must be commenced by Sept. 1, 1926, and must be completed by Sept. 1, 1928.

Granting of the time extension follows a hearing held before the state

supervisor of hydraulics at Olympia July 17, 1925, (Journal of Electricity, Aug. 15, 1925, p. 144). The hearing was for the purpose of compelling the city of Aberdeen to show cause why the permit which it held should not be cancelled because of failure on the part of the city to proceed with construction of the project.

The permit held by the city of Aberdeen is for appropriation of 600 sec.ft. of water from the Wynooche River. The permit originally was issued by the state hydraulics engineer to J. E. Malinowski on Oct. 25, 1922, and was assigned to the city of Aberdeen Sept. 29, 1924, by Malinowski.

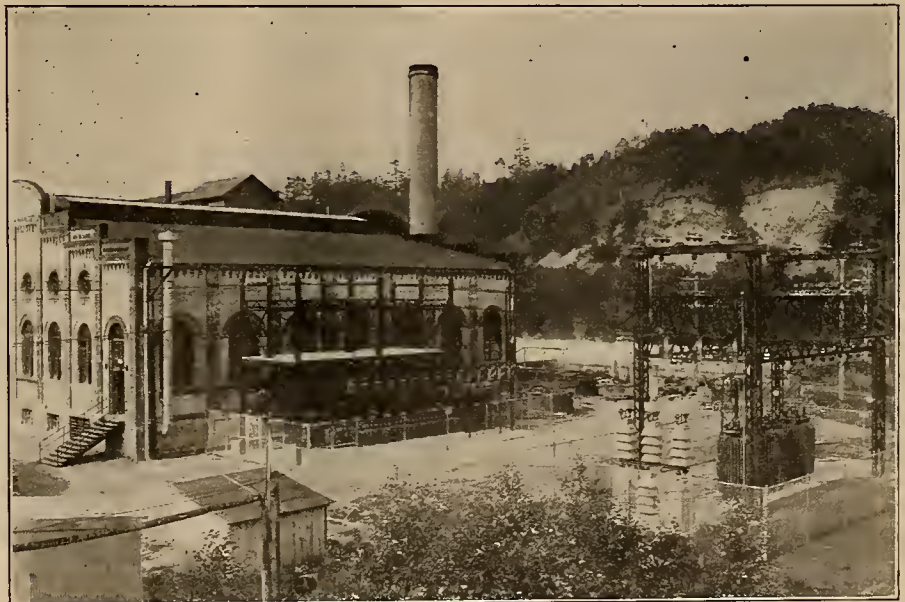
In his decision, Mr. Tiffany stated that evidence presented at the hearing led him to believe that the city of Aberdeen had been working with Mr. Malinowski in good faith to develop a supplemental water supply and that legal delays and the magnitude of the project constituted sufficient excuse for granting the city an additional extension of time in which to begin construction. He further expressed the belief that the Wishkah River, the source of Aberdeen's present water supply, was insufficient for this purpose.

The Simpson Logging Company, the Polson Logging Company and the Grays Harbor Light & Power Company, protested against granting the city an extension of time. (Journal of Electricity, April 15, 1925, p. 297.)

Aberdeen Utility's Rebuilding Practically Completed

With the installation of the new 5,000-kw. turbo-generator in the Electric Park Station of the Grays Harbor Railway & Light Company, Aberdeen, Wash., and of the 5,000-kw. bank of 13,000/4,150-volt transformers in the yard outside the station, the rebuilding program of that company (Journal of Electricity, Sept. 1, 1924, p. 181) practically has been completed.

The structure near the building in the accompanying picture contains switches and feeder regulators for the six 4,150-volt feeders leaving the station. All the company's distribution lines now center at and are controlled from this point.



The Electric Park Station of the Grays Harbor Railway & Light Company at Aberdeen, Wash., where all of the company's lines now center and from which they are controlled

Nevada Irrigation District Asks Commission to Reconsider Yuba River Application

The application of the Nevada Irrigation District for power rights on the Yuba River is to be reconsidered by the Federal Power Commission. The staff of the commission had made an adverse finding in connection with this application. On the basis of a new situation created by the redesign of the Milton-Bowman tunnel and the consequent reduction in the cost of the so-called mountain division of the project, the reconsideration is to be made.

That the matter was certain to come before the commission itself was seen, following the formal notice of appeal made by the irrigation district. The Yuba River Power Company had decided to appeal from any decision to allow the irrigation district to develop the power project should its application for reconsideration be denied. For that reason it was decided to bring the matter before the commission at the earliest possible date. A meeting for that purpose will be held Sept. 21. The irrigation district has entered into financial arrangements which require it to make the delivery of certain bonds on Oct. 8. For that reason it was felt by the district that it is entitled to an answer prior to that time.

The Pacific Gas and Electric Company is to be allowed to make use of the water before it is turned into the

irrigation system. The irrigation district has a contract with that company which proposes the routing of one-third of the water through the Deer Creek plant of the company and the remainder through its Bear River plants. Provision is made also for temporary use of the water at the Halsey and Wise power houses, with the right to use the water in any plants that may be built in the future on Bear River. The contract calls for payment, partially on an acre-ft. basis, and partially on the number of kilowatt-hours generated and the amount of water delivered. After the first twenty-five years payment is to be wholly on a kilowatt-hour basis. The rate is three-fourths of a mill per kw-hr. for all energy generated from district water in any plant of the company.

An analysis of the proposition first submitted, in the opinion of the staff of the Federal Power Commission, indicated that the returns for the sale of power would not carry a sufficient proportion of the interest and charges on the Milton diversion to make practicable the district lands assuming the cost of the development. This situation, however, has been modified considerably through redesign and consequent reduction in cost of storage and diversion works on the mountain division.

B. C. Electric Company Awards Prizes in Essay Contest

An essay contest for employees on the subject of "How Good Public Relations Can Best Be Developed and Maintained on a Sound Business Basis" recently was concluded by the British Columbia Electric Railway Company, which supplies transportation, light, power and gas in Vancouver, Victoria and New Westminster.

Prizes in the amount of \$115 were offered, divided into a first prize of \$50, a second of \$25, a third of \$10, and six prizes of \$5 each. George Kidd, presi-



J. TEASDALE

dent of the company, presented the awards at a luncheon at which he entertained all the writers of essays and the officials of the company.

The first prize was won by J. Teasdale, load dispatcher, Vancouver. Mr. Teasdale emphasized the importance of good service and good rates; of fairness and justice in company dealings; a forward-looking policy as regards extensions, improvements and changes; full information about all company affairs; of continuous advertising; of customer-ownership; and of the careful selection of employees who contact the public.

The second prize was awarded to John Macdonald, conductor, Vancouver; the third to J. G. McLean, track foreman, Vancouver; the fourth to R. L. Forse, operator, Stave Falls plant; the fifth to Bernard Neise, conductor, Vancouver, and the sixth to R. L. Trimnell, operator, Matsqui substation. Additional prizes were won by F. T. Yates, light and power office, Vancouver; Wilfrid Turner, car operator, Victoria; and W. A. Vance, audit department, Vancouver.

That sixty-five employees submitted essays in the middle of the vacation season was considered gratifying by the company. Not only did it indicate keen interest in the subject but many valuable suggestions were received.

City of Tacoma Plans for New Substation and Office Building.—Plans are under way in the Tacoma city engineer's office for the new \$100,000 substation and office building to be erected at South 7th and Broadway. The structure will be four stories high and will house the accounting and drafting departments of the city light and water department. The city council has under consideration three ordinances authorizing the purchase of sites for new secondary substations for the city light department, to be operated in connection with the Cushman power distribution system.

Melones Dam Power Agreement Approved by Commission

Approval was given by the Railroad Commission Sept. 4 to an agreement between the Pacific Gas and Electric Company and the Sierra & San Francisco Power Company (now operated under lease by the Pacific Gas and Electric Company) on the one hand, and Oakdale and South San Joaquin Irrigation Districts on the other hand, under which the power corporation will build a power plant of two units of 13,500-k.v.a capacity, or about 30,000 hp., below the Melones Dam costing \$2,530,000, and transmission lines to Copperopolis and Manteca, costing \$158,000. (Journal of Electricity, June 15, 1925, p. 602.) The power companies are to pay the irrigation districts \$5,175,000 in semi-annual installments of \$64,680.50, payable Dec. 15 and June 15 of each year. These funds will be used by the districts to pay interest upon bonds issued for the purpose of constructing the Melones Dam, and to purchase and cancel from time to time outstanding bonds of the project; and also for such other purposes as the district may desire.

Until the entire amount of \$5,175,000 has been paid by the power corporations the districts are to bear the cost of maintaining Melones dam and reservoir. Upon the completion of such payment the power corporations are to bear one-half the cost of maintaining the dam and reservoir.

Upon the granting of approval, contracts were let by the district for the dam at Melones, the expectation being that the work can be completed in time to catch next spring's flood waters. The Pacific Gas and Electric Company plans to have the power house completed by next fall.

Byllesby & Co. to Change Stock Ownership Plan

Notice was given formally to stockholders of H. M. Byllesby & Company of a meeting of stockholders Sept. 1 to change the stock ownership plan of the company. The plan contemplates the calling in of the preferred and common stocks of the company and the issuing in their stead a new preferred stock, a Class A common stock, and a Class B common stock, the latter to retain the voting power.

In his statement to stockholders, J. J. O'Brien, president of H. M. Byllesby & Company, gives as the reason for the change the demand for stock from employees of the operated and affiliated companies and the desire of the home company to permit employees to make such investment in the company. The redistribution of the stock will make available several large blocks of stock for employee purchase without affecting the personnel, management and control of the company.

Preferred stock of \$100 par value and common stock according to the plan, is to be exchanged for new preferred and common in the following proportions: For each share of preferred will be given five shares of the new preferred which is without par value but which represents about \$20 in assets and two shares of the new Class B common or voting stock, with a similar value in assets and also without par value. For each share of former common, five shares of the new Class A common and eight shares of the new Class B common or voting stock will be given.

The new plan will authorize 925,000 shares of stock, 175,000 of which will be the new preferred, 400,000 of the new Class A common, and 350,000 of the new Class B common.

P. C. E. A. Technical Section Chairmen Announced

Rounding into shape the organization of the P.C.E.A. Technical Section for the ensuing year, all committee chairmanship appointments have been made and confirmed. It is the policy of the Section to select those who have shown interest and aptitude in the various divisions of the work of the Section for the chairmen of the several committees. The list of appointees for the coming year contains the names of men who need no introduction to the men of the industry.

In accordance with the newly established policy of the Section, each committee will have a vice-chairman. These vice-chairmen will be appointed as soon as committee chairmen have had time to effect their programs and organization for the coming period. As is the usual custom, the retiring chairmen will continue to serve on the executive committee.

Executive personnel for the 1925-26 period is as given in the following list:

Executive Committee—Chairman, R. R. Cowles, Pacific Gas and Electric Company, San Francisco; vice-chairman, J. G. Rollow, Los Angeles Gas and Electric Corporation, Los Angeles.

Accident Prevention Committee—Chairman, J. M. Buswell, San Joaquin Light & Power Corporation, Fresno, Calif.

Electrical Apparatus Committee—Chairman, J. C. Gaylord, Southern California Edison Company, Los Angeles.

Hydraulic Power Committee—Chairman, Walter Dreyer, Pacific Gas and Electric Company, San Francisco.

Inductive Co-ordination Committee—Chairman, H. N. Kalb, San Joaquin Light & Power Corporation, Fresno.

Meter Committee—Chairman, R. E. Jones, The Southern Sierras Power Company, Riverside, Calif.

Overhead Systems Committee—Chairman, G. A. Riley, Los Angeles Gas and Electric Corporation, Los Angeles.

Prime Movers Committee—Chairman, J. W. Andree, Southern California Edison Company, Los Angeles.

Safety Rules Committee—Chairman, W. R. Frampton, Southern California Edison Company.

Underground Systems Committee—Chairman, P. E. Chapman, Pacific Gas and Electric Company.

Pacific Coast Vice-Chairmen of Lighting Campaign Named

Announcement has been made by A. M. Frost, geographic chairman of the Pacific Coast Division of the Industrial Lighting Committee, of the appointment of the vice-chairmen who will handle under his supervision the details of the Industrial Lighting Activity in that territory. These men are:

For California—C. D. Monteith, Pacific Gas and Electric Company, San Francisco; H. H. Allison, Great Western Power Company, San Francisco; M. L. Foster, Coast Counties Gas & Electric Company, Santa Cruz; J. F. Pollard, Coast Valleys Gas & Electric Company, Salinas; R. C. Brace, Vallejo Electric Light & Power Company, Vallejo; Frank Weiss, Los Angeles Gas and Electric Corporation, Los Angeles; A. W. Childs, Southern California Edison Company, Los Angeles; W. R. Chawner, The Southern Sierras Power Company, Riverside; C. H. P. Dellman, San Diego Consolidated Gas & Electric Company, San Diego; H. K. Griffin, Western States Gas & Electric Company, Stockton; G. A. Ferguson, Western States Gas & Electric Company, Eureka; C. D. Smith, Ontario Power Company, Ontario; and C. B. Merrick, San Joaquin Light & Power Corporation, Fresno.

For Nevada—O. S. Clifford, Truckee River Power Company, Reno.

For Arizona—P. V. Sanford, Tucson Gas, Electric Light & Power Company, Tucson.

For Hawaii—J. F. Fenwick, Hawaiian Electric Company, Honolulu.

The duties of these men, as set forth by the chairman, will be to survey the industrial lighting possibilities in their respective territories by having power salesmen or other employees canvass the territory and make up a list of real prospects, and to get the information obtained into the hands of someone who will closely follow up the prospect for the purpose of selling equipment and making installations. It is suggested that this follow-up work can be done by the power salesmen of the central station company; by the contractor-dealers, as individuals, or through their local organizations where such exist; and by contact with manufacturers and jobbers' representatives who, the chairman reports, are showing great interest in the work. The details of carrying on such work in the different territories of course are left to the discretion of the vice-chairmen.

Clark Baker, chairman of the Light-in Bureau, Pacific Coast Electrical Association, and Pacific Coast representative of the National Lamp Works, has accepted the chairmanship of the educational committee for the Industrial Lighting Activity. He will organize a staff of specialists who will function

throughout the Pacific Coast Division as instructors in industrial illumination, and also will arrange a program for the conduct of schools to which will be invited central station salesmen, jobber representatives, and salesmen of contractor-dealers.

Western Man Among Prospects for Power Commission Vacancy

The vacancy to be created by the resignation of O. C. Merrill as executive secretary of the Federal Power Commission has caused the names of a number of men to be mentioned as his possible successor. Prominent among these are F. E. Bonner, Dr. F. H. Newell, Paul S. Clapp and Herman Stabler.

Mr. Bonner is a district engineer of the Forest Service with headquarters in San Francisco. One-third of the Federal Power Commission's projects are in his district, and he has had long experience in the handling of water-power matters for the government.

Dr. Newell, an advocate of public ownership but in limited application, was connected with the Reclamation Service from 1902 to 1914 as chief engineer and later as director. He is a past president of the American Association of Engineers. Mr. Clapp, an active opponent of public ownership of electric utilities, has been connected with the Western Electric Company's engineering department, has done research work on the vacuum tube, and had an important part in the inauguration of transcontinental telephony. Mr. Stabler, an engineer with the Geological Survey, had charge of all matters related to the issuance and supervision of permits for water-power use of public lands for the Land Classification Branch of the Department of the Interior, which handled this work prior to the creation of the Federal Power Commission. He has been in close contact with the work of the Geological Survey related to the administration of the federal water-power act and is entirely familiar with Federal Power Commission practice.

New Cheap Power Rate for Large Customers in Portland

Affecting the Portland territory only of the Portland Electric Power Company and Northwestern Electric Company, a new reduced rate for large industrial power users was ordered by the Public Service Commission of Oregon effective Aug. 20, 1925. Under this schedule, which was not opposed by either company, a customer guaranteeing a minimum demand of 4,000 hp. will pay \$27 per hp.-yr. for the highest 30-minute demand during the year. Service will be rendered at primary voltage, thus relieving the company of distribution investment and expense.

The investigation leading to the new rate order was undertaken by the Public Service Commission at the instigation of the Portland Chamber of Commerce. This body in its endeavor to attract to Portland industries using large blocks of power felt the need of a cheaper rate for this power, and hope has been expressed that the new rate will prove to be an inducement to such industries to locate there. Few of the present customers of either company are large enough users to avail themselves of the rate.



The Edison Chorus, composed of employees and officials of the general offices of the Southern California Edison Company, Los Angeles. The group was the winner of the Metropolitan Eisteddfod Contest. The chorus has approximately seventy-five active members.



News of the Electragists



Women to Attend All Sessions of Southern Electragists

The Southern Division of the California Electragists will hold a quarterly meeting at Lebec on Oct. 16 and 17. The executive committee recently announced that the women will be invited to attend all conventions held by the Southern Division and further that they will be invited to attend all sessions of the members and take an active part in the business proceedings.

The merchandising committee appointed at the San Diego convention will present the report of its findings at this meeting. C. A. Rowley, The McNally Company, Pasadena, is chairman of this committee. O. N. Robertson, Robertson Electric Company, Santa Ana, will preside over the merchandising session.

Harold Ashton has opened a new radio and electric store at 1762 Colorado Street, Pasadena, under the name of Ashton's Radioelectric Store.

H. J. Wessel, Fresno; D. E. Erickson, Kingsburg; Jim Baker, and Bakersfield Electric Company, both of Bakersfield, contractors in the San Joaquin Valley, recently have become members of the California Electragists.

The Lake Electrical & Machine Company, 1257 Westlake Avenue, North, Seattle, has received the contract to furnish all new electric motors for the Hofius Steel & Equipment Company, Seattle, in its new plant. The contract includes 50 U. S. Electric Manufacturing Company's heavy duty ball-bearing motors, ranging in size from 2 to 50 hp.

B. R. Fritz, 710 Brockhurst Street, Oakland, Calif., recently acquired the business of the Electric Lighting Supply Company, formerly at 4000 Piedmont Avenue, Oakland, from his partners. He will continue to operate as an electragist.



Mr. and Mrs. O. N. Robertson of Robertson Electric Company, Santa Ana, Calif. Mr. Robertson is chairman of the merchandising division of the California Electragists, Southern Division

Queen City Electric Company, Denver, has taken over the motor repair and service department of R. S. Wilmoughby of the Silver State Electric Company, preparatory to Mr. Wilmoughby's engaging in the jobbing business in that city.

C. H. Whisler and E. H. LaMarsna, co-partners with R. E. Rounsaville in the firm of R. E. Rounsaville & Company, Tulare, Calif., recently have taken over the interests of Mr. Rounsaville in that firm and henceforth will operate under the firm name of the Tulare Electric Company.

The Santa-Hi Electric Company, 6781 Santa Monica Boulevard, Hollywood, Calif., formerly conducted by P. E. Braun and F. W. Redfield, is now operated by P. E. and G. J. Braun, the latter having recently purchased Mr. Redfield's interest.

The Westwood Electric Service Company, 11571 Santa Monica Boulevard, Sawtelle, Calif., has recently opened an electrical supply and contracting store. The business will be conducted by E. E. Holmes, a former local contractor and DeWitt Twaddell, formerly with the Southern California Edison Company.

Four Contractors Become Electragists Following Visalia Meeting.—The following electrical contractors applied for membership in the California Electragists following the quarterly meeting which was held in Visalia recently: H. J. Wessel, Fresno; D. E. Erickson, Kingsburg; Jim Baker, and Bakersfield Electric Company, both of Bakersfield.

H. S. Batchelder, for many years assistant to Tracy Simpson of the Federal Sign System, has started the Standard Electric Sign Company at 1047-B Mission Street, San Francisco.

Stanley R. Wilson has opened a store and sales room at 11207 Santa Monica Boulevard, Sawtelle, Calif., where he will feature electrical fixtures. Mr. Wilson formerly was associated with Beikel & Merigold of Los Angeles.

Electragist Appointed Commissioner of Los Angeles.—Frank McGinley, vice-president of the Southern Division of the California Electragists, recently was appointed commissioner of the Board of Building and Public Safety for the city of Los Angeles by the mayor. His term covers five years. The board consists of five members and has supervision over the building, electrical, and plumbing departments of the city of Los Angeles. All changes in ordinances or digression from the existing ordinances must come before this body for approval. Mr. McGinley is the proprietor of the Harbor Electrical Company, Wilmington, and always has been an active worker in civic affairs as well as in the Electragists' organization.

Robert D. Baer, formerly of the Pacific Coast sales staff of the Incandescent Supply Company of San Francisco, recently has opened a wholesale and retail electrical supply house at 2004 Brooklyn Avenue, Los Angeles, under the firm name of the Baer Electric Company. In addition to general electrical supplies, Mr. Baer is featuring electrical fixtures.

W. M. Moore, of the Moore Electric Company, recently opened a new and distinctive store in the lobby of the Alhambra Theater at 708 W. Main Street, Alhambra, Calif.

The Rollin M. Smith Engineering Company now is established in its new quarters in the Security Bank Building, 1007 West Santa Barbara Avenue, Los Angeles. The firm is equipped to render a complete electrical and architectural service.

Salt Lake Contractors and Dealers Meet Weekly.—The Electrical Development Association, which is the consolidation of the two former contractor and dealer associations in Salt Lake City, Utah, hold weekly meetings at the Elks Club on Tuesdays at 12:15 noon. All contractors and dealers are invited to their meetings.

Markson Electric Company, Los Angeles, recently moved into new quarters at 3936 S. Western Avenue, that city. In addition to the general line of appliances formerly carried, C. H. Markson has added a fixture department and a contracting department to his organization.

T. L. Hall, Pomona, Calif., was among the electragists who attended the annual convention of California Electragists recently held in Eureka. He was accompanied by Mrs. Hall.

J. M. Nightingale, Modesto, A. K. Carson, Bakersfield, and E. E. Elzea and H. H. Courtright, both of Fresno, were among the electragists from the San Joaquin Valley in attendance at the meeting of the California Electragists held in Eureka.

George R. Duncan, formerly representative of the General Electric Company in Oakland, recently has become a member of the staff of the Pacific Electric Motor Company in that city. Mr. Duncan will specialize on the development of electrical equipment among the industrial concerns in the East Bay territory.

H. I. Hartman recently opened the Hartman Electric Service Company at 5313 South Vermont Avenue, Los Angeles. Mr. Hartman was formerly associated with Hartman Brothers of that city. In addition to contracting, he will stock a complete line of appliances.



Al Nicoll, probably one of the busiest men at the recent Electragists' convention at Eureka. On the job day and night

Meetings

Rocky Mountain Division N.E.L.A. Convenes

Reports from the annual meeting of the Rocky Mountain Division of the National Electric Light Association that is now in session at Glenwood Springs, Colo., states that a new record for attendance has been established. In addition to utility representatives and others interested in the electrical industry, there are present many newspaper men and city officials of the Mountain region.

The quarterly meeting of the Colorado Public Service Association also is being held at Glenwood Springs, so that city is the center of electrical interest in that section at the present time.

Detailed reports of both meetings will be published in the Oct. 1 issue of the Journal of Electricity.

“Rooster Chase” and “Laughing” Race Feature Denver Picnic

The electrical family of Denver, 1,500 strong, had its annual midsummer holiday Aug. 6 when the fifth annual picnic of the Electrical Cooperative League was held in that city.

There was every evidence to indicate that the recent affair was a record-breaker in more ways than one. In addition to the big crowd there was said to be a larger number of prizes than at any of the previous picnics., aggregating in value about \$700.

A ball game was the curtain-raiser on the program, and the utility nine headed by O. L. Mackell squeezed in the winning tally after an extra inning had been required to break the tie with a team composed of members of the other branches of the industry.

Sixteen events were listed on the afternoon sports program, including a number of novel events for the women, chief of which was a “rooster chase” with three game white cockerels as the quarry. In a special event for Advisory Board members F. F. McCammon of the Public Service Company of Colorado, was declared by the crowd to be the best “laugher.” Ross Adams and L. M. Cargo won the golfing events.

All of the prizes for the picnic were contributed by members of the league



A display of the prizes, donated by members and awarded at a recent picnic of the Electrical Cooperative League of Denver, on display in the window of the Public Service Company of Colorado

and friends outside of the industry, according to S. W. Bishop, league manager. They ranged from a flashlight to a washing machine, the latter offered by the Automatic Electric Washer Company.

The committees were headed by E. P. Kipp, Clarence Keeler, K. L. Francis, A. E. Bacon and W. R. Kaffer.

P.C.E.A. Technical Section Meet in Los Angeles Sept. 23-25

A conclave meeting of the Technical Section of the Pacific Coast Electrical Association will be held in Los Angeles Sept. 23-25, 1925, at the Los Angeles Gas and Electric Corporation Building, 810 South Flower Street.

The schedule of committee meetings follows:

Committee	Wed.	Thurs.	Friday
Accident Prevention	.....10 a.m.	9:30 a.m.	
Electrical Apparatus	.....	9:30 a.m.	9:30 a.m.
Hydraulic Power	.....10 a.m.	9:30 a.m.	
Inductive Co-ordination			9:30 a.m.
Meters	.....10 a.m.	9:30 a.m.	
Overhead Systems	.....10 a.m.	9:30 a.m.	
Prime Movers	.....10 a.m.		
Safety Rules			9:30 a.m.
Underground Systems			9:30 a.m.
Executive Committee	..... 6 p.m.		6:00 p.m.
Luncheon Meeting		12:15 p.m.	

Headquarters of the Section will be at the Hotel Gates, Sixth and Figueroa Streets.

COMING EVENTS

- Association of Electragists, International—Annual Convention—West Baden, Ind. Sept. 23-25, 1925
- Technical Section, P.C.E.A.—Conclave Meeting—Los Angeles, Calif. Sept. 23-25, 1925
- Electrical Supply Jobbers Association—Pacific Division—Quarterly Meeting—Hotel Del Monte, Del Monte, Calif. Sept. 24-26, 1925.
- California Association of Electrical Inspectors—Semi-Annual Meeting—Fresno, Calif. Sept. 24-26, 1925.
- California Electragists, Southern Division—Quarterly Meeting—Lebec Inn, Lebec, Calif. Oct. 16-17, 1925

Inspectors to Discuss Code and Safety Orders at Meeting

The 1925 edition of the Electrical Safety Orders of the Industrial Accident Commission of California and the 1925 edition of the National Electrical Code will be subjects of paramount importance that will be discussed at the semi-annual meeting of the California Association of Electrical Inspectors which will be held in Fresno, Sept. 24-26. Copies of the Safety Orders and the Code will be distributed to the members attending. Uniform interpretations of these rules will be arrived at during the convention.

Advance proofs of the revised rules of the Board of Fire Underwriters regarding theater and motion picture wiring will be sent to all members in advance of this meeting so that they may be brought up for discussion.

Copies of the uniform electrical ordinance as recommended by the law

committee of the Electrical Manufacturers' Council will be distributed at the sessions.

The meetings of the Association will be held in the San Joaquin Light & Power Corporation Building, and the Hotel Fresno will be headquarters for the convention.

General Electric Company, Schenectady, N. Y., has issued recently bulletin No. 48937.1 entitled “Automatic Arc Welding”, which gives a resume of the uses and value of automatic arc welding, together with a description of the welding apparatus and generating equipment used.

Book Reviews

ELECTRICAL MACHINERY ERECTION

By TERRELL CROFT, Consulting Engineer, Directing Engineer of the Terrill Croft Engineering Company; 314 pages; \$3. McGraw-Hill Book Company, Inc., New York, N. Y.

As the title indicates, this book treats the subject of the erection of electrical machinery and deals with the mechanical rather than the electrical features of installation work.

The text is written in the characteristically straightforward manner of the author and from the practical man's standpoint, as the author states, “for the fellow who must install the equipment.”

It is obviously not a technical book. The endeavor has been to convey the facts graphically, that is, by means of illustrations, of which there are more than 300.

The text is divided into five divisions, and each division is further divided into numbered paragraphs to afford the proper segregation of subjects. The opening division discusses unloading and moving electrical machinery. This is followed by a section devoted to supporting electrical machinery that describes and explains how to arrange and construct wall ceiling, floor supports, and foundations.

Erecting electrical machinery is covered in the third division. The methods which may be employed in getting the unit or its components from the floor onto the supports and into position for alignment are explained in detail.

Locating and fixing is covered in the fourth section. This explains how the machine may be properly aligned, bolted down, and grouted in.

Mechanical maintenance, with particular reference to bearings, is included in fifth division. Bearing troubles and remedies for the same are discussed in detail.

One good feature of the book is the group of questions that is given at the end of each section. Other features are the tables which may be found in the various sections dealing with such topics as, the strength of materials used in erecting, correct temperatures for pouring bearings, organization of the electrical personnel, and the like.

This book should serve its purpose well and prove of value to any electrician or erecting machinist.

Personals

T. F. McDonough, former Seattle district representative of the Benjamin Electric Company, has been transferred to the San Francisco branch of the company. He has been succeeded in Seattle by T. W. Carlson.

A. E. Garland of Garland-Affolter Engineering Corporation, San Francisco, has departed on a three weeks trip to the East where he will visit factory connections.

Herbert Rose, southern California representative of the Federal Electric Company, and president of the San Diego Electric Club, has resigned his position with the Federal company to take charge of the radio department recently created by the Holzwasser company, a San Diego department store. No successor to Mr. Rose has been announced by the Federal company.

A. J. Lutz of the Pacific States Electric Company, Seattle, lately returned from an Eastern trip.

J. B. Black, vice-president and general manager, Great Western Power Company, San Francisco, recently left for New York where he will confer with officials of the Western Power Corporation.

D. E. Harris, president, Pacific States Electric Company, San Francisco, has been elected a director of the Pacific National Bank of that city, succeeding the late Tracy E. Bibbins.

E. C. Magruder, special representative of the Meadows Manufacturing Company, Bloomington, Ill., who has been spending some time in San Francisco, recently visited the California State Fair at Sacramento. C. A. Williams, Western sales manager for the same company, also attended the fair.

Dr. W. R. Whitney of the research laboratories of the General Electric Company of Schenectady, N. Y., was a Seattle visitor recently.

P. B. Lockwood has been made manager of the Walcherson Electric Sales Company, San Francisco, northern California distributors of the Meadows washer, the America cleaner and the York ironer.

E. P. Kipp, Clarence Keeler, K. L. Francis, A. E. Bacon and W. R. Kaffer headed the committees in charge of the recent enjoyable picnic held by the Electrical Cooperative League of Denver.

G. W. Cole, heavy-duty equipment specialist of the Edison Electric Appliance Company, Inc., San Francisco, is planning a trip to San Diego, Calif., shortly in connection with his work.

A. L. Spring, formerly merchandise specialist for the General Electric Company, Los Angeles, has been made regional specialist of the company's merchandising division in that city.

J. R. Geary, representative of the General Electric Company, Tokyo, Japan, was a recent visitor in San Francisco.

E. J. Barnes and R. A. Rowlands, of the General Electric Company of New York, recently spent several days in San Francisco.

F. C. Webber, president of the Synchronous Club of Los Angeles, recently visited San Francisco and vicinity.

Robert Miller, who for the past five years has been local manager of the General Electric Company at Salt Lake City, has been appointed manager of the Rocky Mountain district of that concern, with headquarters in Denver. He succeeds H. D. Randall, transferred to other duties at the main offices of the company at Schenectady, N. Y. Mr. Miller's new duties give him authority over company affairs in half a dozen western states and supervision of radio broadcasting station KOA, owned and operated by the General Electric Company. Mr. Miller has been in the employ of the General Electric Company more than twenty-five years. He entered its service in an unimportant capacity and gradually rose to his present position, having filled numerous posi-



ROBERT MILLER

tions in the laboratories, engineering and commercial departments in the meantime. Mr. Miller is a member of the American Institute of Electrical Engineers, the National Electric Light Association, and the Society for Electrical Development, Inc. He has been prominently identified with the Rocky Mountain Committee on Public Utility Information and the Electrical League of Denver.

N. W. Paterson is now northern California agent for W. W. Kirk, who is the representative of Delta-Star Electric Company and Niagara Electric Improvement Corporation on the Pacific Coast.

H. H. Singletary, engineer in the electric truck bureau of the Pacific Gas and Electric Company, San Francisco, recently was elected secretary-treasurer of the Electric Transportation Association.

B. F. Pearson, manager of the industrial relations department of the Southern California Edison Company, Los Angeles, recently addressed the Rotary Club of Pomona, Calif. His address related to labor troubles and other conditions observed by him in his recent European trip.

Ernest Kipp, representing the Hazard Manufacturing Company, Denver, recently visited Pacific Coast cities in the interests of his firm.

R. G. Gentry, associated with the Public Service Company of Colorado, Denver, recently visited the properties of the company.

J. P. Sprunt, Jr., representative of the Westinghouse Electric Company, Denver, Colo., was a recent visitor in San Francisco.

A. C. Pietrick, electrical engineer formerly with the Northern States Power Company at Cleveland, Ohio, has taken up his residence in San Diego and now is connected with the G. Ivan Peoples Company of that city.

G. C. Tenney, managing editor of the Journal of Electricity, San Francisco, shortly departed for Salt Lake City enroute to the annual convention of the Rocky Mountain Division of the N.E. L.A. to be held at Glenwood Springs, Colo. While in that section he will visit Denver also.

Wellington Rupp, electrical engineer with the Washington State Department of Public Works since 1921, has been made chief engineer for the department. He succeeds J. W. Carey, who has resigned, effective Sept. 14, to engage in private engineering practice in Seattle. M. E. Clark, formerly assistant engineer with the department, has been promoted to assistant chief engineer.

E. O. Shreve, district manager, General Electric Company, San Francisco, recently returned from an extended Eastern trip.

Phil Apfel, president of the Electric Heating & Manufacturing Company, Seattle, recently went to Washington, D. C., in connection with a proposed heating contract for some government buildings.

J. W. Otterson, for the past three years a member of the editorial staff of the Journal of Electricity, has been appointed to the position of business manager to fill the vacancy caused by the resignation of C. M. Lindsay. Mr. Otterson was born in Wallace, Idaho, and educated in the schools of that state and California. He attended the University of California and was graduated from the College of Commerce with the degree of B.S. He majored in advertising and marketing. Following his graduation he entered the employ of H. S. Crocker, Inc., printers and stationers, San Francisco, in the printing sales department. He joined the staff of the Journal of Electricity in September, 1922, as assistant editor. In June, 1924, he was promoted to the position of associate editor. His work on the editorial staff has been connected largely with the merchandising branch of the electrical industry. He has played a prominent part in the activi-



J. W. OTTERSON

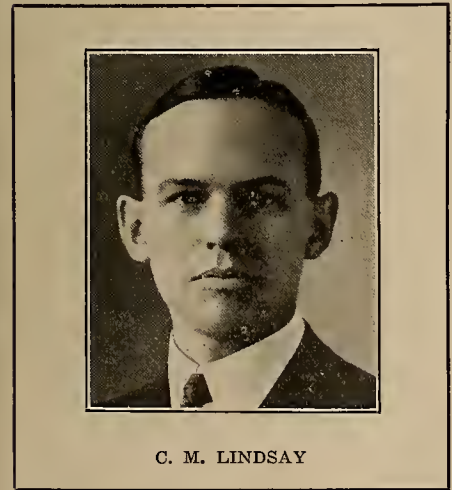
ties of the San Francisco Electrical Development League and the commercial section of the Pacific Coast Electrical Association.

George Erich, Seattle representative of the Federal Electric Company, has planned a trip to Chicago by way of San Francisco.

T. E. Downs, formerly in the appliance department of the Puget Sound Power & Light Company, Seattle, has resigned to take over the Washington district of Rathbone-Sard & Company, distributors of Acorn electric ranges. Mr. Downs has been succeeded by T. A. Marden.

W. W. Allen, sales manager of the Electric Corporation, Seattle, recently spent two weeks in Los Angeles, his former home town.

C. M. Lindsay has resigned his positions as vice-president, secretary and treasurer of the McGraw-Hill Company of California to engage in business for himself in San Jose, Calif. Mr. Lindsay was graduated from the Armour Institute with the degree of B.S. in electrical engineering. A short time after leaving college, he went to California and became identified with the Hotpoint Company at Ontario as assistant to H. A. Lewis, who at that time was general sales manager. Mr. Lindsay's work was sales organization and sales promotion, and through this he gained a wealth of experience that stood him in good stead later on. When the Hotpoint Company was purchased by the Edison Electric Appliance Company Mr. Lindsay joined its staff in Chicago as sales promotion manager, a position which he held until he was invited to join the McGraw-Hill Company, Inc., as assistant to H. A. Lewis, business manager of Electrical Merchandising. A short time after the McGraw-Hill Company purchased the Journal of Electricity Mr. Lindsay went to California as business manager of that paper and also secretary and treasurer of the McGraw-Hill Company of California. In 1922 the title of vice-president was given to him in recognition of the value of his services. Mr. Lindsay has taken a keen interest and played a prominent part in the affairs of the electrical industry on the Pacific Coast. For nearly two years he has been secretary and treasurer of the San Francisco Electrical Development League, and has been especially interested in the problems of the contractor-dealer. In severing his connection with the McGraw-Hill Company Mr. Lindsay



carries with him the respect and esteem of all of his associates and their cordial good wishes for the greatest success in his new undertaking.

B. C. J. Wheatlake, formerly manager of the central station department of the General Electric Company at Denver, has been appointed to succeed Robert Miller as local manager of that company at Salt Lake City, Utah. Mr. Wheatlake started work with the General Electric Company July 1, 1910, spending approximately one year on the test course and one year in transformer designing. He went to the Denver office of the company in 1912 as transformer specialist. He later was made manager of the supply department, and for the last four years has been manager of the central station department. For the last ten years Mr. Wheatlake has been very much interested in the activities of the American Institute of Electrical Engineers. He



was president of the local section at Denver three years ago, and twice has represented the Denver section as delegate to the national convention. While in Denver he took an active interest in the Electrical Cooperative League and also the Rocky Mountain Committee on Public Utility Information. Mr. Wheatlake has written a number of papers on electrical development subjects.

William Baurhyte, president, Los Angeles Gas and Electric Corporation, and president of the Pacific Coast Electrical Association, is planning to attend the meeting of the National Executive Committee of the National Electric Light Association, which will be held in Chicago, Ill., Oct. 26-27.

Samuel Taylor, secretary of the Pacific Coast Electrical Association, will be one of the members of that organization attending the meeting of the National Executive Committee of the National Electric Light Association, which will be held in Chicago Oct. 26-27.

Robert Miller, manager of the General Electric Company, Denver, has returned to that city after a series of conferences in the East with company officials.

C. W. Burkett, formerly chief engineer, Pacific Telephone and Telegraph Company, recently has become consulting engineer for that company.

C. E. Flager has been appointed chief engineer of the Pacific Telephone and Telegraph Company to succeed C. W. Burkett.

E. N. Bryan, formerly office engineer with the California Division of Water Rights, has been appointed chief deputy of the division.

Obituary

Harry W. Reilly, formerly active in construction work for the Western Byllesby organizations, the Western States Gas & Electric Company and the San Diego Consolidated Gas & Electric Company, and well known throughout the industry in the West, died at the home of his sister in Milwaukee, July 23. At the time of his death he was assistant to the vice-president in charge of operations of the Oklahoma Gas & Electric Company. Mr. Reilly was identified particularly with Western activities about the time of the acquisition of the Western States properties by the Byllesby company. Coming to Stockton from San Diego, where he had supervision of the big construction program at that property in 1912-13. Mr. Reilly conducted the valuation of the Western States Gas & Electric property, rebuilt the two systems serving Stockton into one system, installed its underground system and made extensive improvements to the gas plants. At San Diego he also installed the first underground system, aided in the extension of the first line from San Diego to connect with the Edison company lines at Capistrano, and other major construction activities. He left San Diego for Oklahoma in 1917, leaving behind him a host of friends and admirers. Harry Reilly was a native of Albany, N. Y., graduated from the University of Wisconsin with a degree in electrical engineering in 1897, and was active in engineering for some years before joining the Byllesby construction organization in 1910.

T. H. Foley, vice-president and general manager of the Bend Water, Light & Power Company, Bend, Ore., died Aug. 16, 1925, from injuries received in an automobile accident Aug. 15. Mr. Foley came to Bend in 1910 as a line-man. He soon showed a capacity for a larger usefulness in the light and power industry and advanced through the position of superintendent to be manager of the then small town electric plant. Enlarging the operations of his company always well in advance of the growth of the city, Mr. Foley developed what is considered to be one of the most progressive small utility properties in the West. When the American Power & Light Company acquired the property in 1924, Mr. Foley was retained as vice-president and general manager.

John Edgar Miller, father of John B. Miller, president of the Southern California Edison Company, died at his home in Pasadena, Calif., Sept. 7, of heart failure, at the age of seventy-nine. Mr. Miller was a native of Michigan and for the last sixteen years had been a resident of Pasadena. For a great many years he had been associated with the Pacific Mutual Life Insurance Company. He is survived by two sons, John B. Miller, president of the Southern California Edison Company, and Frank E. Miller; a daughter, Miss Clara Miller, and his widow, Mrs. Sarah Miller. E. G. Miller, a grandson, is treasurer of the Southern California Edison Company.

TRADE NOTES

Charles Cory & Son, Inc., New York City, has accepted the exclusive manufacturing and selling rights of Kent's clear view screens for the United States and Canada. It is claimed that the merits of the screen have been proved completely in shipping, railway locomotives, yachts, high-speed power boats, aeroplanes and automobile application. The screens consist of a polished glass disc rotated on a central bearing by an electric motor at such speed that rain, spray and snow are dispersed instantly and complete transparency is maintained in all weather and clutches.

The Advance Machinery & Supply Company, Denver, Colo., has issued a new bulletin entitled "A Long Step Forward", which describes the Advance stoker, giving details of operation and advantages of its use.

Crouse-Hinds Company, Syracuse, N. Y., has issued recently a folder illustrating in actual size its screw cover junction condulets and giving description and dimensions of the conduit.

The French Battery & Carbon Company, Madison, Wis., has announced a refinancing plan and renaming of its concern to the French Battery Company. It will increase its stock greatly and expand its plant, including enlarged warehouse facilities and equipment.

Harvey Hubbell, Inc., Bridgeport, Conn., recently has put on the market a new line of porcelain outlet receptacles for use with either 3¼-in. or 4-in. outlet boxes on metal ceilings and concrete or tiled walls.

The Master Electric Company, Dayton, Ohio, has issued recently a new folder entitled "Master Quality with Service", which fully describes and illustrates its Master superpower repulsion induction motors and calls attention to all its special features.

A. J. Lindemann & Hoverson Company, Milwaukee, Wis., manufacturers of L & H electric ranges and appliances, has placed on the market a new electric waffle iron. It is of square colonial design, which it is claimed makes extra large waffles. The iron is made of brass with a heavy highly polished nickel finish.

Square D Company, Detroit, Mich., has announced recently a new type of power panel, which it is claimed is very compact, making it possible to keep the cabinet dimensions comparatively small.

Paul W. Koch & Company, Chicago, Ill., has developed a new "Jiffy" solder dipper, which solders pig-tail joints and tin cable ends without the necessity of constant use of the blow torch. It will not burn the insulation nor cause it to melt and run, and it is claimed to be a valuable labor-saving device.

Herman H. Sticht & Company, New York City, has issued bulletin No. 130, describing two types of the Model "D" Standco megohmmers.

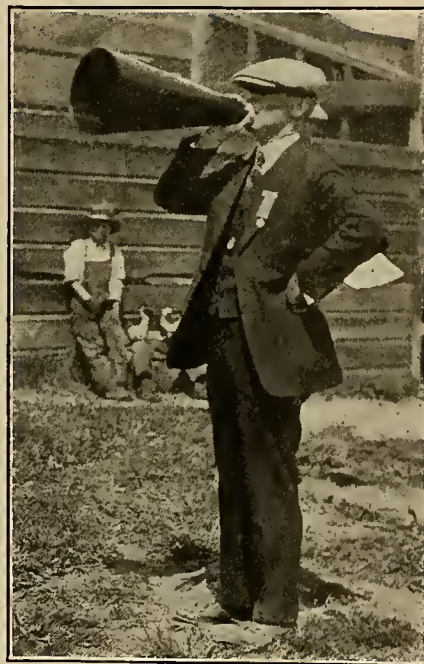
Wagner Electric Corporation, St. Louis, Mo., has published recently a pocket-sized booklet containing fifty questions and answers relating to power-factor.

Gisholt Machine Company, Madison, Wis., has placed a new type of balancing machine on the market which it is claimed is designed especially for short work, such as flywheels, pulleys, fans and clutches.

Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has added new single and double-flash receptacles to its C-H wiring device line.

Century Electric Company, St. Louis, Mo., has issued recently a new folder describing and illustrating its refrigeration motor for household refrigerating machines.

Chicago Fuse Manufacturing Company, Chicago, Ill., has developed a new design of "Union" renewable knife blade fuse, which, it is claimed, makes the fuses exceptionally simple in design and construction.



Who was that umpire? Why, Don Ray, himself—not a moving picture.

The Johns-Pratt Company, Hartford, Conn., has issued an announcement regarding its Noark underground boxes and points out the important advantages of its product.

Monitor Controller Company, Baltimore, Md., has issued recently a profusely illustrated booklet, giving a complete description of its automatic equipment for the control of newspaper and magazine printing presses and paper calendaring machines. The booklet also gives an interesting historical sketch of the development of newspapers and newspaper printing.

Roller-Smith Company, New York City, has issued bulletin No. 530, which is descriptive of its non-closable on overload circuit breakers.

Detroit Stoker Company, Detroit, Mich., has issued bulletin No. 1018, a 32-page issue, describing its Detroit underfeed stokers of the single retort type. It is claimed that among other items of outstanding interest to combustion engineers the bulletin contains a number of fuel bed cross-sections, showing conditions of the fire with respect to air distribution and movement toward the dumps.

The Fem Company, Portland, Ore., is announcing the advantages attributed to its electric washer, which it is claimed is the only piston electric washer on the market. The machine is described fully in a recently issued folder.

Harold E. Trent, Philadelphia, Pa., has developed a new soldering iron appliance for heavy work that it is claimed has characteristics that never before have been achieved in this class of apparatus, as it has the ability to heat up to soldering temperature and to maintain that temperature indefinitely.

Capitol Stage Lighting Company, New York City, has issued recently two complete catalogs, giving prices and descriptions of its theater equipment. The catalogs are well illustrated.

The Kuhlman Electric Company, Bay City, Mich., has appointed the Stevens Sales Company, 134 West Second South Street, Salt Lake City, Utah, as district representative for the state of Utah and parts of Idaho and Nevada, adjacent to Utah. The Stevens Sales Company will handle Kuhlman power, distribution and street lighting transformers.

The Electric Controller & Manufacturing Company, Cleveland, Ohio, has issued recently bulletin No. 1042-E, which gives a complete description of the E C & M automatic compensators for a.c. squirrel-cage motors.

Reynolds Electric Company, Chicago, Ill., has issued recently bulletin No. 801, describing special control devices which it makes. The same include timers for traffic signals and special flashers of various descriptions.

Elwell-Parker Electric Company, Cleveland, Ohio, has placed on the market a new tool, designed for the sheet and tin plate industry. The unit is driven by electric motor, receiving power from battery carried.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a descriptive and illustrated booklet entitled "Bright Streets are Busy Streets," by L. A. S. Wood, manager of the street lighting section of the company. The book covers the advantages of better street lighting.

Manning-Bowman & Company, Meriden, Conn., are demonstrating the advantages of their M-B waffle irons in their new announcements. The M-B Hotakold vacuum bottle with its new handle and larger cups is also featured.

Anderson-Pitt Corporation, Kansas City, Mo., is introducing a new type of electric heater in which all the coils face the reflector, by which principle it is claimed no heat is wasted.

General Electric Company, Schenectady, N. Y., recently has changed its demand meter known as the Type G. The stylus actuating mechanism of the redesigned meters equipped with a totalizing register, thus providing a means of checking the number of impulses recorded by the demand meter against the reading of the watt-hour meter, is among one of the changes featured.

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES



Meadows
TRADE MARK REGISTERED

Thousands of opportunities to render "A PERFECT SERVICE" await the alert dealer who places Meadow Washers in the homes of his community.

"PERFECT" because he creates permanent friendships and ample profits, neither of which are endangered through the need for adjustments.

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Butte Electric Company, Butte, Montana

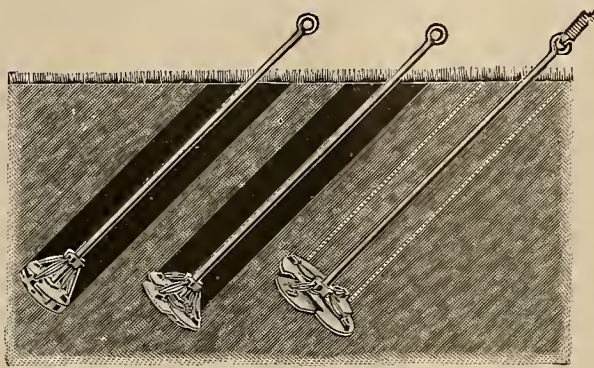
CLIFFORD A. WILLIAMS

Western Sales Manager
373 Brannan Street, San Francisco, California

WESTERN DISTRIBUTORS:

Capitol Electric Co., Salt Lake City, Utah
Fobes Supply Company, Seattle, Wash.
Fobes Supply Company, Portland, Ore.

EVERSTICK ANCHORS



Permanent Installations

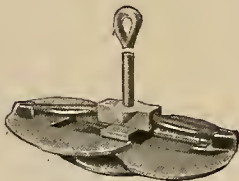
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LOS ANGELES



Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."

Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

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R. N. PHELAN, Associate Editor

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VOLUME 55

SAN FRANCISCO, OCTOBER 1, 1925

NUMBER 7

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McGraw-Hill Company of California — 883 Mission St. — SAN FRANCISCO

Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

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WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave., at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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By McGraw-Hill Company of California

Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

What Will Close Scrutiny of Your Market Reveal?

IN an attempt to arouse a national appreciation of the need for improving industrial sales efficiency and to awaken a keener interest in the correct principles of industrial selling, the McGraw-Hill Company is publishing a series of advertisements in some of the important newspapers of the country. In these advertisements are emphasized the McGraw-Hill "Four Principles of Industrial Marketing," namely, market determination, buying habits, channels of approach, and appeals that influence.

In this issue on pages 40-41 is reproduced the fifth advertisement of this series showing how one manufacturer by applying these four principles discovered new opportunities for increased sales and profits. The pertinent query, "What Will Close Scrutiny of Your Market Reveal?", brings the matter directly home to the individual or organization with something to sell. Emphasizing the necessity for a true inventory of sales possibilities, the McGraw-Hill Company offers to assist manufacturers and their advertising agents in analyzing their markets and applying the four principles to their own selling and advertising; it places at their disposal its knowledge of industry gained through fifty years of intimate contact; and, through its fifteen publications, presents for their guidance information on the activities of many industries.

As a first step in the analysis the reading of "Industrial Marketing" is suggested. This book, the results of a broad study of the buying habits of the industry, the McGraw-Hill Company will send upon request to any manufacturer whose market includes any of the industries covered by its publications.

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Electrical World

Electric Railway Journal

Engineering and Mining Journal-Press

Bus Transportation

Engineering News-Record

Coal Age

Radio Retailing

Power

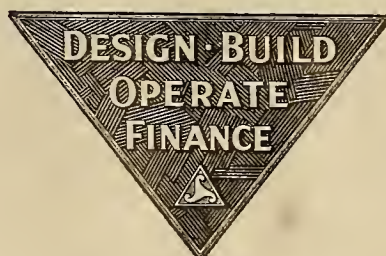


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NEW YORK, 120 Broadway
PHILADELPHIA, Real Estate Trust Bldg.
PITTSBURGH, Union Trust Bldg.

EDITORIAL

Government Ownership Battleground Transferred to Oregon

NEWS that the State Grange, the Umatilla Rapids Association, the Housewives Council and other organizations in Oregon, backed by Governor Pierce, are attempting to get together on a constitutional amendment permitting the state to go into the power business on a large scale, and providing the funds and machinery therefor, is not altogether surprising. To suppose that Oregon politics, lying between the Water and Power Act on the south and the Bone Bill on the north, could escape infection is to make the wish father to the thought.

But one could have hoped that the state ownership proponents of Oregon might have learned from the experience of their colleagues in the two adjoining states, and have saved the citizens of that state the expense and grief of a bitter political battle over an issue similar to that which was defeated so overwhelmingly in California and Washington last year. However, people have been known not to learn from the experience of others, and the government-ownership proponents seem ever anxious to keep trying, both in the old fields and new, in an apparently everlasting endeavor to insert the entering wedge that might lead to an expansion of their activities.

Neither was it altogether a surprise to learn that Governor Pierce might take a hand in framing the legislation and even go so far as to adopt it as a major provision in his program for re-election. There are many who believe that through his inability to keep his campaign promise of tax reduction he may feel that he has lost some of the political prestige which put him into office. His favorite scheme for economy, the state income tax, proved on trial to be not what it seemed and was repealed last year. It may be that, mistaking the pleas of the political ownership advocates as the voice of the people, he has determined upon what he considers a chance for leadership in this movement in the hope of regaining his political losses. Others have followed the same will-o'-the-wisp before, with varying degrees of success.

In spite of the merits of the case, or lack of them, there is bound to be a fight. Industrial history has proved that such a political program, when well prepared and planned, finds a ready reception from enough voters to make it a somewhat doubtful issue, one which cannot be laughed off easily. The electrical industry of the West has had experience with this sort of thing and knows it cannot sit back and

let matters follow an unresisted course. It would seem, then, that it must prepare to take off its coat and roll up its sleeves as soon as the definite program is made known.

Glenwood Springs Convention Sets New Record

A RECORD for sectional National Electric Light Association conventions has been set by the Rocky Mountain Division at its recent Glenwood Springs meeting. In point of attendance it was the largest meeting ever held in this section; in excellence of program it followed closely behind the national convention at San Francisco; and with a program so arranged that meetings were held from 9:30 to 1 o'clock each day, ample time was provided for recreation.

The registration list not only showed representatives from practically every power company in the division, but manufacturers, jobbers and contractor-dealers as well. Representatives from more than a dozen newspapers attended the sessions. The program contained the names of men prominent in the electrical industry in the division, the governor of Colorado, Congressmen from both Utah and Colorado, utility commissioners from Colorado, Oregon and Kansas, the president of the Denver Chamber of Commerce, leading members of the Colorado bar, the mayor of the City and County of Denver, and the presidents of three leading Intermountain universities.

The frankness and enthusiasm with which the speakers attacked the problems of the division, namely, the Colorado River and the establishment of a sound utility commission law in Colorado, were inspiring. We recommend a careful study of the account of the convention in this issue by all members of the industry in the West so that they may become informed of the problems of the Intermountain states and the progress which is being made in meeting them.

Undeveloped Water Power and Super High-Voltage Transmission

THERE is a great deal of undeveloped water power in the Pacific Coast territory; more here in fact than in any other part of the United States. Political difficulties hedging about the Colorado River, plus a physical difficulty with reference to the large quantity of silt carried by that interesting river, would appear to delay that possibility of development for

some time to come. California is more nearly developed up to capacity than Oregon or Washington, and it does not require a soothsayer to be able to predict that before very long California's potential water power will have become wholly active. In the Northwest, however, this situation is much further away. In the Columbia River there is nearly one-seventh of the total potential water power in the United States and there are many other smaller projects offering great possibilities.

The market for this power, however, is the rub at present. This lends fresh interest to experiments now being conducted in what might be called super high-voltage transmission offering ranges of one thousand miles or more for the economical transmission of electrical energy. The possibility of an interconnected system in the United States whereby electrical energy generated on the Pacific Coast may be transmitted almost as far east as the Mississippi is not so wild a dream as may appear at first thought. People alive today may see a realization of the Baum plan or some modification thereof, and the prosperous and populous central territory made more fruitful by the blessings of electrical service, using energy generated in the mountains of the Pacific Coast.

Clearing the Atmosphere for the Farmers

TO those unthinking, uninformed and misguided individuals of the Northwest (and they are by no means confined to the Northwest) who believe that the reason all farms are not electrified is because the government has not developed Umatilla Rapids or some other pet project, thereby making "cheap" power available, the recent report of the Oregon Committee on the Relation of Electricity to Agriculture will be a shock.

This report, in the form of a printed booklet entitled, "Electricity in Oregon Agriculture", reviewed on another page of this issue, contains a clean-cut presentation of the general and specific problems based on the field survey conducted in that state last year, and clears the atmosphere of the haze of doubt concerning the use of electricity in which the agricultural element is apt to labor. It reveals that the main problems are economic and agricultural rather than engineering and electrical.

Clothed with the authority of authorship by a committee having national recognition, and concurred in by members of that committee representing agriculture, this report certainly must carry weight with the farmers, and since it is desirable that the farmer have a more enlightened understanding of the problem and a more tolerant attitude toward the utility company that asks him for an advance payment on account of a line extension to serve him, it is a pleasure to learn that the committee is taking steps to give the booklet a wide distribution.

In the matter of rural electrification the electrical industry has done its part and stands ready to continue to do it. It has pioneered and experimented on its own initiative, and it has taken the first steps to

bring together into cooperative effort the interests involved in the solution of the larger problem. It is fitting that the farmer be made to realize and accept his responsibility in the matter, and no way to make him realize it seems better than to put him in possession of the facts and findings in this and future reports of this committee.

Many of the statements and conclusions of the report have been known to the electrical industry for some time; for instance, "... the art of generating and distributing electric current is well in advance of the art of using it on the farm. It is not a case of more power stations but of finding out whether or not an electric load of sufficient size can be built on the farm so that the farmer can afford to carry the necessary expense involved in furnishing service." It is doubtful if the farmer as a class has heard of this phase of the question, though demagogues may have told him and he may believe that, if all the water powers were developed, power would be so cheap that he could have service for a half a dozen lights and a flat iron even though he might be many miles off the utility company's lines.

Further, he probably never before has been told that, "In the last analysis the farmer is the man who will say whether or not electric service will be used in agriculture." Or that, "Once the essential facts regarding the economic uses of electricity are made available, its ultimate place in Oregon agriculture will be determined more by the initiative of the farmer than by any other agency." These and other truths in the report, from the mouth of his own committee so to speak, ought to awaken him to an appreciation of his own responsibility, and to offset to some extent the kind of patronizing demagoguery to which he has been accustomed. Truly, in the hope of a possible meeting of the minds of apparently conflicting interests and in the expectation of better public relations for the power companies this booklet should be broadcast.

Ice Cream Manufacturer Is Refrigeration Salesman

POWER companies and manufacturers have a new salesman for electric refrigeration. He is the ice cream manufacturer. The experience in one western city in this respect may serve as a guide for central stations in other communities.

In this particular city the largest ice cream maker was quick to recognize the advantages of electric refrigeration to him. Servicing, that is, providing the dealers who retailed his product with ice and salt, cost this manufacturer an average of fifteen cents per gallon of ice cream delivered. With a small refrigeration unit operating on the commercial lighting rate installed in the candy, drug or other store selling his product this cost was reduced materially. In fact the saving was so great that the manufacturer found he could purchase refrigeration units and install them himself in the stores of those of his customers who would sign a contract to retail his product over a long period of months. In cases where the merchant was not willing to sign such a contract he offered a reduction in the cost of ice

cream of from fifteen to twenty cents per gallon, provided the merchant himself would install an electric ice cream cabinet.

Thus the power company in this particular community has a strong ally in selling electric refrigeration. It is able to use the sales argument of lower cost of product to those stores retailing ice cream, and it can point to the exceedingly low cost of electric refrigeration from the energy standpoint.

Newspapers Urge More Appliances in the Home

LET the home be supplied with equipment as modern as that of the office or the factory, is a slogan that the electrical industry well might adopt. Electric labor-saving devices have lightened work and increased production in both office and factory, but the home is far from being completely equipped with modern electric appliances. The editor of the "Oregon Statesman" of Salem, Ore., under the heading of "Lighten the Burden" recently took up in his columns the cause of the industry when he said:

"The modern office and even many farms are equipped with all sorts of conveniences, including labor-saving devices. At the same time only twenty per cent of the homes are thus provided. The vast majority of women are doing the same kinds of drudgery in the same hard way that they were done years ago.

"Every woman should demand that the home shall be given due consideration in modern progress and that the household burdens shall be lightened for her as they are for him who works in the office, factory or on the farm. And it is the duty, and should be the pleasure, of every man blessed with a home to respond favorably to these demands and conditions."

Do Members of the Electrical Industry Lack Courage?

OUR readers will be interested in an editorial appearing in the Electrical World Aug. 29 last. This editorial is entitled "Wanted—More Courage." Courage is a desirable attribute, and it seems that members of the electrical industry are reproached for their lack of this desirable characteristic in pushing sales of their wares.

We have with us John, Mary and their children, representing or typifying the great American household market. We have the spectacle of the afore-said John and Mary buying their automobile complete with all accessories, not merely a motor one month, a transmission six months hence, a tire or two in a year, to be followed by a radiator and a body at some time in the distant future. This thought may seem absurd to many; nevertheless is not that the way the electrical industry is selling electrical appliances? Our merchants timidly suggest a flat-iron. As their increment of courage increases they progress to a curling iron or a heater for shaving water; eventually they may get around to a water heater, an air heater or even a range. The Electrical World suggests that it is incumbent upon the electrical industry to figure for the customer ways and means of making the regular household budget pay

for all appliances by setting up an easy-payment-plan contract and a regular schedule of appliances required to present a reasonably complete electrical household rather than to emulate the example of the mouse who only nibbles.

There is food for serious thought in this idea. In many parts of the West, notably in California, great campaigns are under way on the part of central stations for increasing the domestic load. It has been pointed out before in these columns that house-to-house canvassing rarely results in selling to more than one or two prospects out of twenty calls. The balance of eighteen remains at the disposal of the local representatives of the industry in each district traversed, requiring only a little further attention in the way of suggestion and solicitation with the proper follow-up to sell the electrical idea. With the sales effort now being made by the central stations as the ice-breaker, it ought not to be difficult for the rest of the industry to realize fully on the opportunity that is knocking at its door.

DISCUSSION

Discusses Contractor's Problem of Operating at a Loss

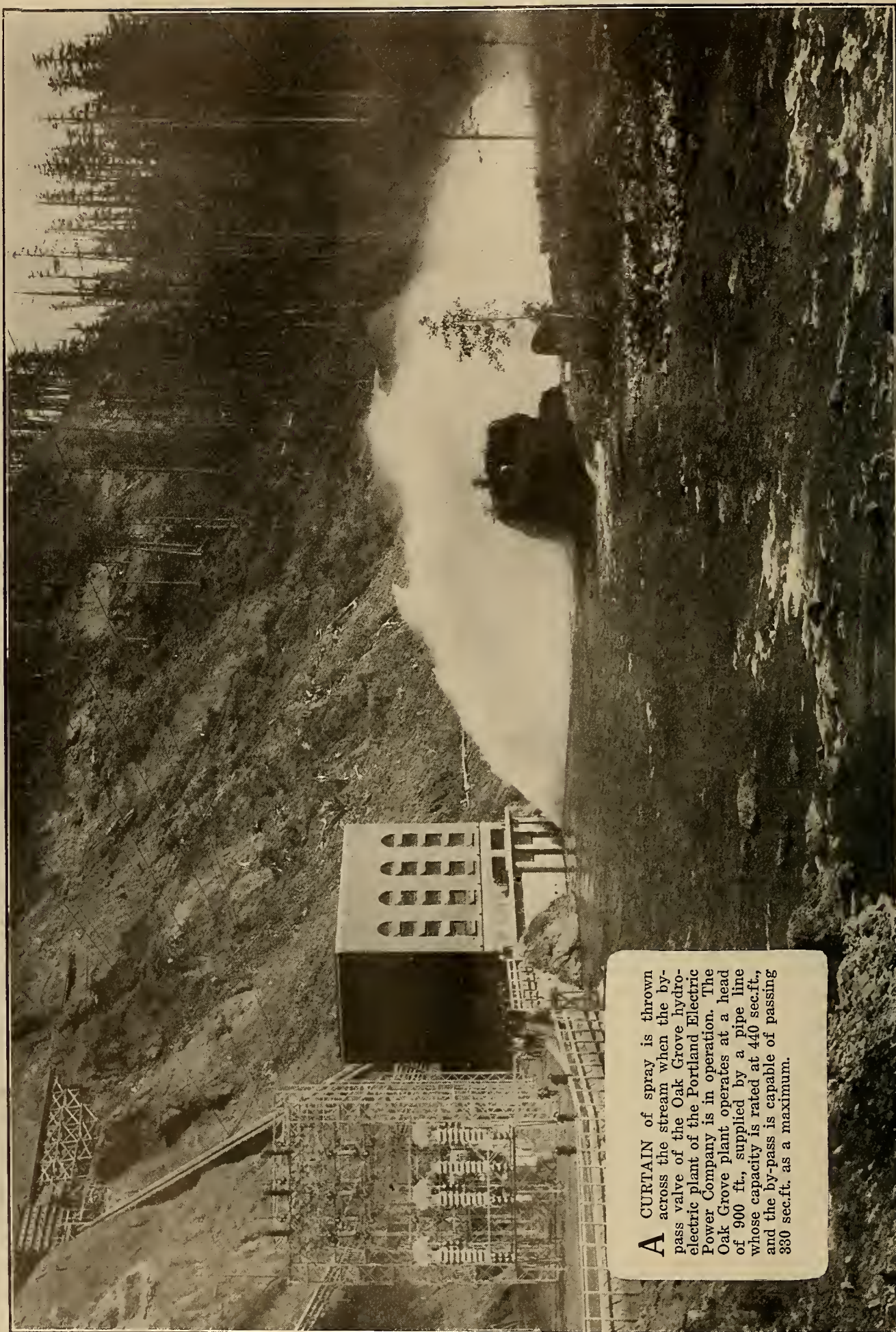
To the Editor:

Sir:—When a contractor-dealer can show a list of materials to be used on a job, the selling price of which is \$2,504.34, cost price \$2,130.00, with a gross profit of \$374.34, it becomes apparent that the margin of profit is getting down alarmingly near rock bottom. It amounts to exactly 17.5 per cent in this case. Under normal circumstances it is well nigh impossible to operate a contractor-dealer establishment with an overhead of less than 20 per cent. Therefore this order costs this contractor-dealer money to handle, and it is apparent that a sufficient number of these orders will drive his concern into bankruptcy. If this supply house were the only one with this problem on its hands, the remedy would be quite obvious, but a careful analysis of the sale price of materials on this bill shows that they are not out of line with the prices quoted by other contractor-dealers.

Just what the solution to the problem of this increasing menace to the prosperity of the contractor-dealer is, it is impossible to say. General opinion has it that the old law covering the survival of the fittest will do its best to solve the problem. Wise contractor-dealers who have seen the writing on the wall already are exerting every effort to meet the condition by increasing their specialty sales or by educating their sales force to the value of pushing those particular items of stock which represent a fair margin of profit.

R. G. KENYON.

Los Angeles, Calif.,
Sept. 5, 1925.



A CURTAIN of spray is thrown across the stream when the by-pass valve of the Oak Grove hydro-electric plant of the Portland Electric Power Company is in operation. The Oak Grove plant operates at a head of 900 ft., supplied by a pipe line whose capacity is rated at 440 sec.ft., and the by-pass is capable of passing 330 sec.ft. as a maximum.

Important Triad Discussed at Pacific Coast Convention of A.I.E.E.

THREE major lines of thought occupied the time and attention of the 300 members of the American Institute of Electrical Engineers gathered at the fourteenth Pacific Coast convention held at the Olympic Hotel in Seattle, Sept. 15-19. These three divisions of interest were: high-tension transmission, engineering research and education, and distribution practice. Several matters of vital and many of popular interest were presented and ably discussed there by well qualified men. The scope of experience represented in the twenty-six papers presented was broad, for it is notable that nearly a third of them were from the East. This fact itself demonstrated the interest of the East in the problems facing the electrical industry on the Pacific Coast.

High-Tension Transmission

Papers and discussions given subdivided the subject of high-tension transmission into two parts. One of these dealt with operating experiences with and characteristics of transmission systems. The other had to do with design.

Information brought out relative to the operation of existing long lines at 220 kv. dispelled persistent fears, beliefs and suspicions that many "mysterious" phenomena might be expected to be inherent in such lines. Disturbing transients, standing or traveling waves of damaging magnitude, serious switching and trouble-relief difficulties and other more or less expected bugaboos resulting from 220-kv. operation have failed to materialize. Short-circuits have been taken care of easily through quick acting relay and circuit-breaker combinations, the surges therefrom rarely disturbing system equilibrium. Flashovers in the most part have been traced definitely to birds and their lack of proper discretion, at least as far as Pacific Coast lines are concerned. Flashovers on eastern high-tension lines are due largely to lightning. In either case, however, the situation is well under control and even better results are to be expected in the future.

Far reaching and rather pointed discussion on the subject of the stability of power limits of any given transmission system brought out interesting facts. It is worth mentioning that the use of the term "stability" was questioned severely. It was pointed out that while the term was technically correct and understood by transmission engineers, it was a term

***H**IGH-TENSION transmission, engineering research and education, and distribution practice formed the three main subjects of interest at the Pacific Coast convention of the American Institute of Electrical Engineers, meeting in Seattle. The East brought its experience to the West, both profiting by the exchange of thought provided by this unusually worth-while convention, a digest of whose activities and papers is given herein.*

which lent itself readily to misinterpretation in the public mind. The fact that engineers were considering the "stability" and the "instability" of these vital arteries of industrial and commercial life might easily be construed in a wrong light by the non-technical. Substitution of the more accurate and truly descriptive term "power limit" was thought to be far more desirable. Power limit suggests nothing startling to the uninitiated as it is recognized that there are

limits to anything.

Power limit calculations have proved so nearly correct from operating experience that faith in such calculations has been strengthened materially. It was shown that characteristics of all machinery connected to a given system must be considered, in making these studies. The thought of those interested in wide interconnection between systems is that all of these factors should be considered carefully in order to outline clearly the logical and economical course to pursue in such interconnections.

Transmission line design was considered in three different papers. Simplified and more accurate methods of calculation were offered, showing that study and effort are being given toward securing even greater design and operating economy than now are common.

Research and Education

Research and education and the inter-relation between them received thoughtful consideration. It is difficult to cover in a few words the field of thought covered by the several able papers and the attendant discussion on the subject. However, some of the items of importance were:

The value of research to the industry.

The value of research in training the engineering student to think constructively.

The value to both to be had from greater cooperation between industrial research organizations and the universities.

Length, breadth and proper scope of logical training for engineering students.

These items brought out diversities of opinion, as might be expected. However, there seemed to be an agreement that proper training for an engineering student consists in bringing him sufficiently up to date to stand upon his own feet and take his place in contemporary development as well as in giving him a

sufficient understanding of human affairs to inspire him to be useful in fields other than the purely technical. Opinions differ as to whether courses should be four, five or six years in length.

Trend of Distribution

Principles and practices relative to power distribution occupied more time and energy than any other single feature of the convention. Two divisions of thought were noted. One of these was in the nature of a review of construction and operating practices and experiences and the other a study into future needs and possible developments.

Past experiences have provided some very tangible bases upon which to work and have shown an economic necessity for making extensions along definite plans. The division of utility activity known as distribution engineering has grown out of a gradual realization and appreciation of the vital operating and economic position of this phase of power work. It was graphically pointed out that the best possible generating and transmission system would be worthless without adequate distribution facilities; hence the development of this division of activity from "service-wagon engineering" to full-fledged recognition.

Just what the future and ultimate distribution voltage may be is a matter of opinion. Many things, not the least of which are local conditions, such as topography, resources and other items, are certain to have a decided effect upon the final decision. One definite trend is toward higher distribution voltage, and another is toward a greater development of the unit-type system wherein higher voltages than the present accepted 4 kv. will be unnecessary. However, when densities get up as high as 75,000 kw. per sq. mile, as in certain eastern centers, and prospects are for an increase to 200,000 kw. per sq. mile, there is some reason to expect that distribution voltages may be further increased.

The application of automatic protective devices to underground distribution systems and several novel means of increasing continuity of service were outlined in some of the papers and discussions.

Needs, results and methods of full cooperation between power and communication utilities on the problem of inductive interference received due consideration. There is some difference of opinion as to where the major responsibility rests, but it is agreed that some responsibility exists.

Indications are that it will be no real problem to effect an economic balance in and between the design and operation of power circuits and the design and operation of communication circuits so that both services may be fully efficient.

Dr. Suzzalo Opens Convention

Proclaiming himself as a humanist, Dr. Suzzalo, president of the University of Washington, graphically pictured the importance of institutions of higher learning when he said that, figuratively speaking, he had one foot in the world of science, business and engineering, in that he was studying the needs of that world in the way of future man-

power and research. With the other foot in the university and its various activities, he was attempting to arrange the satisfactory education of those attending his institution to meet the demands which the outside world would place upon them upon their graduation. Responsibility for the education of the rising generation rests not alone upon the shoulders of those organizations devoted to that particular



DR. HENRY P. SUZZALO

field, but likewise rests equally upon the established industries of today.

Recognizing the great value of the large industrial research organizations, Dr. Suzzalo stressed the utmost importance of a greater and more complete understanding and cooperation between the industrial research organizations and activities and those similar branches of university work, if the greatest common economic good is to be realized. As research is a vital and fundamental part of industrial development, just so is research a vital and fundamental part of the work of a university in its endeavor to train men to serve present and future industrial needs. Therefore full cooperation between the two is highly advisable.

The successful engineer must be a citizen in the full sense of the word. He should have a knowledge of and an active interest in civic affairs. He should have a comprehension of economics, of politics and of the thought-exchange medium of the age, literature, as well as of other items of human interest. Whether the necessary knowledge of these things is to be obtained through an extension of engineering courses to cover an additional period of a year or two; whether the same end shall be accomplished through a suggested series of elective subjects from which the student may choose those he will study in parallel with his technical subjects; whether these side experiences shall be obtained solely through the school of hard knocks and actual operating experience after graduation, all this is a matter of open question, according to Dr. Suzzalo, and one to which much thought and study are being given by educational men as well as by practicing engineers. It seems indisputably logical that upon those of engineering training may be expected to fall any or all of the demands of present-day civilization.

In closing his address the doctor expressed a profound appreciation of the engineering vision "which builds its dreams upon realities and not upon high-sounding words nor phrases."

Dr. Ryan Responds

Promising a greater appreciation of the matters pertaining to the fields of engineering education and cooperative engineering research, Dr. Harris J. Ryan head of the electrical engineering department of Stanford University, Palo Alto, Calif., in his response to Dr. Suzzalo's opening address, called attention to



DR. HARRIS J. RYAN

the papers upon these very subjects scheduled to be read and discussed at the convention.

Briefly reviewing the development of the railroad systems as of twenty-five years ago and the closely following communication network now in such common use, Dr. Ryan pointed to a not-far-distant tomorrow and the realization of the present combined activities of executive and engineer toward power transmission networks through which the needs of humanity will be served even more expeditiously. It is his belief that each of these conventions forges a new link in an ever-lengthening chain of progress in the electrical engineering art and activities, and establishes a working plane upon which to do further constructive work. Dr. Ryan pointed out that the future holds not only the reclamation of the power resources of the jungles, and the full development of power possibilities as they are recognized today, but also the vast potentialities incident to the release of the vast storehouse of energy in matter itself.

National Secretary Speaks

Expressing regret that Dr. Michael Pupin, president of the Institute, was prevented from attending the convention by the press of matters requiring his attention, F. L. Hutchinson, secretary of the Institute, made a few remarks. Mr. Hutchinson outlined a few features and recent developments in Institute affairs and organization and also brought an echo of the Saratoga convention of the New England division.

President's Address via Telephone

Dr. Pupin delivered his address from New York City over the transcontinental telephone lines. It was an entire success. In his talk, "Engineering and Public Service," he mentioned the fact that Washington, Franklin and Jefferson all were engineers, and he outlined the value of their services to the nation because of their technical training. Many instances were cited to prove the necessarily close relation existing between the fields of scientific and human endeavor. Dr. Pupin lamented the apparent

lack of interest of the technical man in civil matters of vital importance. The engineer, because of his training, is peculiarly fitted to render inestimably valuable service along non-technical lines, and Dr. Pupin exhorted him to recognize such opportunities and responsibilities. The erroneous and too widely held belief that all science is contrary to spiritual facts and humanistic needs is, in the president's belief, due to the devotion of scientific men to their work and their consequent failure to assume their proper place in the community.

TECHNICAL SESSIONS

In order to give a general idea of the different papers presented at the various sessions the following notes covering each one are offered. These are too brief to be dignified by the name of abstracts for no attempt is made to do more than present the more important high lights of each and the conclusions, if any, reached.

Stored Mechanical Energy in Transmission System

By J. P. JOLLYMAN, San Francisco

Performance of stored mechanical energy in moving masses connected synchronously to a transmission system, considered during changes in load, changes in input and changes of transmission capacity. Stored mechanical energy affects greatly the performance of a transmission line during sudden changes in line capacity occasioned by switching out or in a parallel circuit. Such switching operations lead to oscillations of input due to the interaction of stored mechanical energy and the altered difference in phase between generated and received voltages of a transmission line. A typical system is considered and some interesting figures arrived at. For instance, the total stored mechanical energy in a 27,000-kva., 225-r.p.m. hydro unit is 16.2 kw-hr. and in a 20,000-kva., 600-r.p.m. synchronous condenser is 11.5 kw-hr.

Transmission Line Design—Mechanical Design of Spans, with Supports at Unequal Elevations

By G. S. SMITH, Seattle

Derivation of practical method of design, based upon catenary formulas, for spans, the supports of which are at unequal elevations. Further intended to formulate completely method for applying the calculations to any cable freely suspended or uniformly loaded and for obtaining cable characteristics after temperature or loading conditions have changed. Present needs for more accurate computation methods surveyed briefly. Several formulas given, their derivation explained and application illustrated by typical line problems. Two alternative methods of application given and explained.

Data entered upon a complete set of forms, so tabulated and identified that by supplying proper constants same set of calculations may be applied to similar span problems. Computation method derived has the great advantage that once a representative set of calculations is made and results interpreted by curves, any similar span problem may be solved therefrom. Method is particularly adapted to relatively long spans.

The Long Span Across the Narrows at Tacoma

By J. V. GONGWER and A. F. DARLAND, Tacoma

Interesting points in this paper concern 316-ft. transmission towers being built for 6,200-ft. span in 110-kv. Cushman-Tacoma line, 37-strand steel conductor used for the span, method of arranging 12 parallel strings of insulators used per conductor end, and use of buried, 20-cu.yd. concrete anchors.

220-kv. Transmission Transients and Flashovers

By R. J. C. WOOD, Los Angeles

Conclusion reached that birds are chief cause of flashovers on high tension lines of the So. Calif. Edison Company. Gives a tabulation of location and frequency of flashovers covering period of nine years' operation at 150 kv. and two years at 220 kv. Great increase (250 per cent) in flashovers experienced when line voltage first raised to 220 kv. Has been overcome completely and number reduced to previous figures by installing bird guards at sources of worst trouble. Guards, however, not completely bird-proof. Further experimenting being

done. Other possible flashover causes considered, including corona, standing and traveling waves of high voltage, harmonic resonance, sustained high-frequency effects, lightning, and highly ionized air. Investigations to discover presence of such disturbances described include use of home-made photographic surge recorder, the klydonograph and the oscillograph. Amplitude of voltage surges caused by various switching operations and quantities of tertiary and residual currents at the different stations tabulated. Conclusions reached are: Corona in amount found upon arcing horns did not cause flashovers. Voltage surges of sufficient magnitude to cause flashover or damage to equipment do not occur. Voltage rises as great as any recorded arise from switching. Voltage rises recorded at or about time of two flashovers may have been due to subsequent switching and were less than many known to have arisen from switching. High tension switching as practiced on the Edison system may be done without fear of danger. Only occasionally did voltage surges travel even 35 miles without great attenuation. Such alternating surges as were found were highly damped, being usually of but one alternation. There were no harmonic resonances nor distortion of voltage wave shapes. Residuals to ground were small. There were no high frequency effects.

Fundamental Considerations of Power Limits of Transmission Systems

By R. E. DOHERTY and H. H. DEWEY, Schenectady

Discuss need of study at present time in view of probable extension of inter-connection between systems. Necessity of quick acting voltage regulation on synchronous apparatus discussed. Suggest certain changes in machine design. Suggest possible use of mercury arc rectifier in generator field circuit.

Transmission Stability

By C. L. FORTESCUE, Pittsburgh

Preparing way for further papers on subject to be presented at midwinter convention in East, author gives brief history and discussion. Necessity of studying characteristics of all machinery connected to a system is pointed out. Brief sketch of effect of such factors as inertia of moving parts, mechanical torque, speed of relay and circuit breaker operations, etc. Author's conclusions as to two most important means of getting most out of present-day designs are: Improved inherent regulation of machine. Increased speed of excitation.

Steam Power in its Relation to the Development of Water Power

By R. C. POWELL, San Francisco

Attention drawn to desirability of water power resource development on comprehensive economic basis. Discusses relations existing between development of steam power and economic development of water power. Secretary Hoover's statements at N.E.L.A. convention quoted in support of contention that failure to develop steam power in proper proportion and skimming of cream of hydro development will inevitably forestall complete development of water power resources. Limitations of cost curves frequently used comparing costs of steam power and water power outlined. Simple method given whereby minimum cost of power may be found for an assumed water power development with auxiliary steam power. Specific examples worked out by suggested means, show power costs lower for combined development than for all water power development. Fuel prices, load factor and other significant figures taken into account.

Application of Electric Propulsion to Double-Ended Ferry Boats

By A. KENNEDY, JR., and F. V. SMITH, Schenectady

Outlines tests, compares cost and operating characteristics of electric and other means of propulsion. Double-ended boats are only logical craft for handling short run traffic in congested harbor waters. Concludes that reciprocating steam or Diesel engine operating bow and stern propellers at same rotational speed require 19 per cent more power than electric system due to propulsive efficiency differences. Fuel consumption of reciprocating steam engine drive with direct-connected bow and stern propellers requires 40 per cent more power than turbine electric system due to differences in propulsive and thermal efficiencies. Comparing turbo direct current and alternating current, direct current is superior in flexibility, simplicity of control and general handiness afforded by bridge control. Alternating current slightly more economical as regards fuel consumption. Operating records prove electric drive reliable and a great step forward. Both turbo-electric and Diesel-electric drive overcome inherent propulsive efficiency loss of reciprocating steam engine type drive. Respective spheres of application dependent upon relationship of first cost to operating charges and needs of service.

Some Features and Improvements on High-Voltage Wattmeter

By J. S. CARROLL, Palo Alto, Calif.

Instruments for measurement of power and voltage at high potentials without use of connections with supply transformers described. Uniqueness and ingenuity of equipment devised are interesting.

On the Nature of Corona Loss

By C. T. HESSELMAYER and J. K. KOSTKO, Palo Alto, Calif.

Conducting qualities of air under certain stresses dealt with as suggested by title.

The Study of Ions and Electrons for Electrical Engineers

By HARRIS J. RYAN, Palo Alto, Calif.

A contribution to educational activities of the Institute. Would arouse interest on part of engineers for the study. Paper is brief. Suggests that knowledge of more important factors in behavior of ions and electrons should be helpful to all electrical engineers.

Engineering Research—An Essential Factor in Engineering Education

By C. E. MAGNUSSON, Seattle

Suggests industrial organizations establish numerous research fellowships in engineering colleges, not as gratuities but as necessary investments against their own future need of properly trained staff additions. Cooperative work between research departments of industrial organizations and educational institutions increased. Some form of bonus system be established by which engineering colleges would receive financial returns from industrial organizations for having discovered and trained exceptionally successful engineers.

Educational institutions take out patents on new ideas of commercial value originated by faculty members; that is, expand and make effective the plan recently adopted by Columbia University.

Research foundations established as integral parts of engineering colleges.

Larger share of normal income of educational institutions be expended upon investigational work.

An exchange of engineers between and among engineering faculties, industrial organizations and perhaps even between European and American investments.

The Relation Between Engineering Education and Research

By R. W. SORENSEN, Pasadena, Calif.

Outlines efforts of California Institute of Technology to meet present-day technical educational requirements by extending regular course to five years. History, English, economics, and other important subjects part of regular curriculum. Special attention given research work. Surveys made among students to determine motives causing students to enter. Stricter entrance requirements have reduced first-year failures.

A New Departure in Engineering Education

By HAROLD PENDER, Philadelphia

Six-year course combining ordinary college and engineering courses and capable of completion by high school graduate described. Believes: Will give student opportunity to form more mature judgment as to his aptitude for engineering and, if lacking, permit him to continue other studies without handicap.

Will impress on both student and parent that engineering is profession and not trade; more to engineering education than mere fitting to get a job.

The graduate from such course will be as well prepared for his immediate undertaking as usual technical school graduate. Will have background and broader viewpoint necessary to development in his profession, and proper perspective of life.

Distribution Line Practice of the San Joaquin Light & Power Corporation

By L. J. MOORE and H. H. MINOR, Fresno, Calif.

Practice of that company in serving rural communities; also covers briefly pole handling methods, spans and conductors used, a special 11.5-kv. fuse developed by the company and other items. Economies effected by its hot-wire maintenance methods and tools in 11.5-kv. line maintenance discussed. Outlines unusual 2-3-kv. automatic voltage regulating system used in Fresno.

Improvement in Distribution Methods

By S. B. HOOD, Minneapolis

Maintains protective measures applied to low-voltage distribution network can be utilized to improve operating characteristics of entire distribution system, and lower installation cost. Broad development of common-neutral system discussed as applied to system of Northern States Power Company. Heavy-duty alternating current underground network and remote-control multiple street-lighting systems described are listed as inter-related with common-neutral development. In-

interesting feature mentioned is return to multiple system of street lighting wherein distribution done at regular distribution voltages and normally closed, remotely controlled, contactor controls local lamp circuit. Claimed that power losses during daylight hours in contactors are negligible compared to high-tension series transformer losses.

The 60-Cycle Distribution System of the Commonwealth Edison Company

By W. G. KELLEY, Chicago

System's energy generated in five stations and transmitted at 12 kv., 3 phase, to both manually operated and remotely controlled substations. Operation of latter under control of former by means of control-wire and selector-switch operation. Larger customers supplied by industrial substations located on premises and fed from 12-kv., 3-phase, underground loop circuits. General load supplied by means of 2.3/4-kv., 3-phase, 4-wire radial circuits from various manually operated and remotely controlled substations. Generator capacity was 420,000 kva. and maximum load 379,000 kva. (Jan. 1, 1925,) for 60-cycle portion of system, exclusive of load carried on 25-cycle and direct-current portions of plant. Reliability of service is provided by relay-controlled oil circuit breakers, current, limiting reactors, duplicate supply lines and tie-points for the inter-connection of different parts of system. Rapid growth of load density in some parts of Chicago will soon necessitate modification of present distribution system, either by increasing in distribution voltage or circuit capacity.

A High-Voltage Distributing System

By G. H. SMITH, Seattle

Seattle municipal system now operating at 26 kv. Plan is to carry high-voltage lines close to load centers, keeping secondary lines short. Each 26-kv. line either returns in loop to opposite half of originating bus or ties on another station bus. Voltage chosen because capable of handling sufficiently large blocks of power to take care of growth and may be applied to underground cable use as being conservative.

Distribution to Supply Increasing Load Densities in Residential Areas

By M. T. CRAWFORD, Seattle

Grid-form of service network of uniform conductor size laid out to cover entire residential area and designed to care for maximum load density without reconstruction. As load densities increase, additional feeders may be run and grid or net work fed at increasing number of points. The system is most flexible and voltage regulation is effected within two per cent. Heavy power load carried on 13-kv. loop feeders. Advantages claimed: Construction economy under conditions of light-load density followed later by rapid growth. Ability to meet more exacting requirements of voltage regulation and service reliability demanded by increase in domestic use.

Distribution Practices in Southern California

By R. E. CUNNINGHAM, Los Angeles

Substations, lines and local transformer installations described. Notes especially general use of 3-phase transformers on 11- and 15-kv. systems in sizes of from 10 to 100 kw., Y-connected on the high side with variable taps on neutral legs, permitting service of light, heat and power from single unit.

Power Distribution and Telephone Circuits

By H. M. TRUEBLOOD, New York, and D. I. CONE, San Francisco

Inductive and physical relations between two classes of circuits involve consideration of details of design of both systems, each expanding rapidly and having goal of universal electric service. Location, design, construction, operation and maintenance of both systems must consider plant and human safety and suitable provisions for expansion. Residual currents in power-distribution systems as outstanding cause of inductive interference on telephone lines. Limitations of residual dependent upon the type of distribution. Telephone toll circuits, to avoid exposure by choice of locations usually possible and most satisfactory measure of prevention or mitigation. Telephone cables with continuous metallic sheaths, grounded continuously or at terminals helpful. Interference seldom produced by exposure to power circuits in underground cable. Design and construction of new plant for both classes of service, and choice of relief measures in existing cases, should be guided by sense of common responsibility to insure co-ordination during great growth anticipated.

Induction from Street Lighting Circuits

By R. G. McCURDY, New York

Discusses series street lighting circuits in relation to nearby telephone circuits. Have greater inductive influence in proportion to power transmitted than most other distribution circuits due to relatively large distortions in wave shapes of

voltage and current on certain type circuits and to unbalanced voltages to ground occurring series layouts. Three general type lighting circuits discussed, alternating-current arc circuits, direct-current arc circuits supplied by mercury rectifiers, and alternating-current incandescent circuits. Incandescent type wherein lamps equipped with individual series transformers or auto transformers is most important. Measures for reducing interference from these lighting circuits discussed.

The Radio Interference Problem and the Power Company

By L. J. CORBETT, San Francisco

Summarizes complaints on radio interference. Typical causes in the various fields of utilization of electric power with the aim of indicating relative proportion chargeable to power companies. Radio industry itself through movable or extraneous sources, signal lines and equipment, power lines themselves, connected power company equipment, connected commercial loads, household circuits and appliances discussed. Location methods are described together with mitigation measures found effective.

Opportunities and Problems in the Electric Distribution System

By D. K. BLAKE, Schenectady

Illustrative electric service system analyzed to show importance of distribution system. Diversity factor and load factor employed to show effect of investment and losses. Alternating-current networks discussed relative to switching, induction regulators and alternating-current elevator equipment. Circumstances making single-pole switching preferable outlined. New, simple and effective connection of control circuits of induction regulators to insure stability in parallel-operated circuits described. Present status of alternating-current elevator equipment outlined with emphasis upon the merits of Ward-Leonard control where high-class service required. New translator network analyzed to show performance and inherent difficulties, giving 3-phase, 4-wire, 115/2,300-volt system in no way affecting consumers' meters or utilization devices. Says may be adopted on grounds of company policy rather than technical and engineering economic. Recent developments in carrier-current control for street lighting equipment encouraging. Static condensers located at the load center of distribution circuits prove economical in some cases. Various automatic and remote-control sectionalizing schemes under consideration to restore quickly service on feeders.

Engineering and Economic Features of Distribution System Supplying Increasing Load Densities

By L. M. APPLGATE and W. BRENTON, Portland

Large savings possible by designing present systems conforming with future requirements determined from study of population, utilization increase, comparisons of total investment required, and annual operating costs. Points to 4-kv., 4-wire primary distribution. Portland Electric Power Company, standard methods and locally derived costs outlined.

ENTERTAINMENT PROGRAM VARIED

Nor was the convention one continuous and strenuous series of technical discussions. A well rounded program of entertainment and sports also had been arranged, including inspection trips to some of the Northwest's most notable electric projects. In the golf tournament, Wednesday afternoon, playing for the John B. Fiske cup, W. C. Heston was winner, with Prof. R. H. Dearborn second and P. M. Downing third. Simultaneously there were offered an inspection trip through the Cedar Lumber Manufacturing Company's plant, the substation of the Chicago, Milwaukee & St. Paul Railway, or to the real feature of the convention entertainment, the "K-B" boat. The reception to the officers was held Tuesday evening, and Thursday evening a dinner dance took the place of the usual banquet. Numerous teas and entertainment features, among them a special performance given by the Cornish School, were designed to make the stay of the ladies delightful during the convention. The Lake Cushman and Baker River hydro-electric developments were visited by many on Saturday, following the close of the convention.

Edison Company Seeks 100,000 Owners in Unique Club Sales Plan

SINCE the inception of the customer-ownership idea in 1914 central stations operating in the West have tried with considerable success a number of plans laid out to further the ownership of stock by customers of the company. In most cases the stock has been sold directly by the companies, acting through a special stock sales department, or in a few cases through the entire personnel of the company. Both methods have proved satisfactory, according to the amount of time and energy put into the work.

A campaign that was not aimed primarily to sell stock or to finance the construction activities of the company but rather to increase the number of stockholders and customers and local citizens was put into operation recently by the Southern California Edison Company. While the plan contemplated the sale of stock by employees of the company, it was of an entirely different character from anything that had been tried by other western public utility companies.

In contemplating means of increasing the number of customer-owners, W. L. Frost, general commercial manager of the company, laid the structure for the new campaign upon the loyalty of the employees toward the company. To give the employees an opportunity to express this loyalty, the plan was to organize what was to be known as the "100,000 Club." The club took its name from the fact that the desire of the company was to increase its customer-owners from 72,000 to 100,000 in the period of eighteen months.

The plan as worked out under Mr. Frost's direction provided that every employee would be given the opportunity to express his desire to assist the company in its activities and at the same time to better himself financially by selling small blocks of preferred stock of the company to his friends and to customers of the company. A general invitation was sent to each employee of the company giving the details of the organization of the "100,000 Club," together with the aims of the executives. Those who desired to join the club signed an application blank, thus enrolling in the "100,000 Club" and taking a pledge to exert themselves in the drive for new customer-owners. The invitations were sent out by Mr. Frost and were actually a personal suggestion that the employee might assist the company and make

NOT a drive, not a campaign in the ordinary sense, but a consistent effort to increase the number of partner-owners in one of California's greatest electric utilities to 100,000, is this plan whereby the employees of the Southern California Edison Company are seeking to enlarge their company's list of shareholders.

a commission for himself if he enrolled in the drive for new stockholders among the company's consumers.

Employees Anxious to Participate

Interest in the "100,000 Club" was evident from the original announcement on May 15. The personnel of the company was anxious to participate in such a drive and a large percentage enlisted in the club immediately. At the present

time there are approximately 500 employees of the Edison company actively supporting the right to belong to the "100,000 Club" through their efforts to sell only small blocks of stock.

Small commissions are paid to the employees, but it is evident that the primary force behind the drive for new customer-owners is the spirit of competition that has been aroused in the club. The members of the club have been divided into a number of different groups, several different methods of grouping having been employed to stimulate this competition. Individual effort also is increased by the publication each month of the names of those securing the greatest number of new customer-owners. These names, according to the number of points won, the grading being based only on new customers obtained, are published in the Bulletin of the "100,000 Club." The aim of each employee of course is to head the list of employee stock salesmen.

On May 15 there were 71,300 individual stockholders in the Edison company. On Sept. 1 there were 80,000, and the number is to be increased to 100,000 within the next year.

Organized on a highly competitive basis as they are, the members of this club have made some remarkable records. For example, the high man in two months sold 159 new stockholders, and two men working together sold 32 new subscribers in one day. In every case stock-selling is a side line and the members must keep up their regular work. To compensate for the extra time required beside the small commission paid, a bonus is provided for the 200 members who can maintain a monthly average of eight new stockholders and thereby qualify for Class A.

As a further incentive, each member securing 100 or more new stockholders during the campaign is given a gold button with the legend "100 Club". To date, four members have qualified for this additional honor while twenty-three have passed the 50 mark.

Record Convention Held by Rocky Mountain Division, N.E.L.A.

STATE regulation with the future possibility of initiating an amendment to the Colorado state constitution eliminating the present system of home rule of utilities in chartered cities; the development of the Colorado River, and public relations were the major themes of the sixth annual convention of the Rocky Mountain Division of the National Electric Light Association and the twenty-second annual convention of the Colorado Public Service Association at Glenwood Springs, Colo., Sept. 14-17, 1925. The meeting set a new standard for sectional N.E.L.A. conventions both in size and diversity of attendance and in excellence of program. The total registration was in excess of two hundred and sixty.

No less than eight speakers stressed the advantages of sound state regulation of utilities over regulation by cities, the method in force in Colorado at the present time. Included among them were utility commissioners from Kansas, Oregon and Colorado and leading members of the Colorado bar. The Colorado River was discussed by L. Ward Bannister, president of the Denver Chamber of Commerce and consultant to the Colorado River Commission, and by Congressmen from both Utah and Colorado. One entire session was devoted to a discussion of public relations.

First General Session

C. A. Semrad, vice-president and general commercial manager of the Public Service Company of Colorado and president of the Rocky Mountain Division, N.E.L.A., opened the first general session Monday, Sept. 14, with a short statement of the problems confronting the electrical industry in the Rocky Mountain states. State regulation of utilities in the case of Colorado, better public relations for all utilities in the division, and careful consideration of the question of taxation were the

THE meeting of the Rocky Mountain Division, N.E.L.A., at Glenwood Springs, Colo., sets a new standard for sectional meetings of the organization. Among the important subjects considered were state regulation, the development of the Colorado River and public relations. Considerable attention also was paid to the work of the women in the industry.

Clarence J. Morley, Governor of Colorado, who wished the industry success in the solution of the problems confronting it. Other speakers were B. F. Stapleton, mayor of Denver, and Edward Taylor of Glenwood Springs, U. S. Congressman.

Section Meetings

For the first time in the history of the conventions of this division meetings were held by the four sections—public relations, commercial, technical and accounting. It is believed that a precedent has been established in this move which will be followed at all future conventions.

Many interesting subjects were discussed at the meeting of the public relations section. "This Obscure Factor—Public Relations" was the subject of

points he emphasized. I. E. Pratt, president of the Glenwood Springs Chamber of Commerce, welcomed the delegates to Glenwood Springs and extended to them the hospitality of the city. Charles R. Brock, prominent Denver attorney, responded to Mr. Pratt's address of welcome and made an appeal for sound public relations of utilities.

One of the features of the convention was the appearance on the program of

an address by George A. Davis, manager of public relations, Oklahoma City Gas & Electric Company, Oklahoma City, Okla. Mr. Davis emphasized the point that public relations is a function of every employee of a public utility from the youngest office boy to the highest executive. He urged the industry not to attempt to commercialize its good public relations. He warned against any feeling of self-satisfaction where good public relations have been developed in a community and urged every utility to be always on the alert to improve this factor in its business. He described in detail a plan which has been worked out in his company where every



ARTHUR PRAGER, vice-president and general manager, Albuquerque Gas & Electric Company, the president-elect. C. A. SEMRAD, vice-president and general commercial manager, Public Service Company of Colorado, president until next July, and O. A. WELLER, Public Service Company of Colorado, secretary of Rocky Mountain Division, N.E.L.A.

consumer who enters any office is escorted to the place where his or her business is to be conducted. Properly trained girls have been stationed at desks at each office door for this purpose. Such good public relations have been developed by this move that these young women are called upon to do anything from taking care of parcels to watching children while mothers are shopping.

V. L. Board, general superintendent, Public Service Company of Colorado, and chairman of the Industrial Relations Committee, spoke on the subject, "Developing a Sense of Partnership Between Employer and Employee," in which he discussed the work of the Industrial Relations Committee of the N.E.L.A. in its studies of pension systems, group insurance and like subjects.

"Let the Women Do It" was the subject of a paper by Miss Inez Thompson, Public Service Company of Colorado, Denver, and Chairman of the Women's Committee. Miss Thompson told of the organization of the committee which she heads and described its work. She urged that women be employed exclusively in the complaint departments of power companies.

The place of the trade journal in the industry was discussed by George C. Tenney, managing editor, Journal of Electricity, San Francisco. He pointed out that only by reading and supporting its trade journals can the industry profit by the service they are rendering. He described the work of the McGraw-Hill Company in aiding the industry in its publicity through the circulation of a national news service to all important papers covering subjects of popular interest reported in its publications.

John F. Greenawalt, publicity manager, Mountain States Telephone & Telegraph Company, Denver, in an address entitled "How Shall They Know If We Do Not Tell Them?", described the work of the Rocky Mountain Committee on Public Information in conducting a series of classes in public speaking in which younger men in the utilities were taught the rudiments of public speaking. He urged the utilities

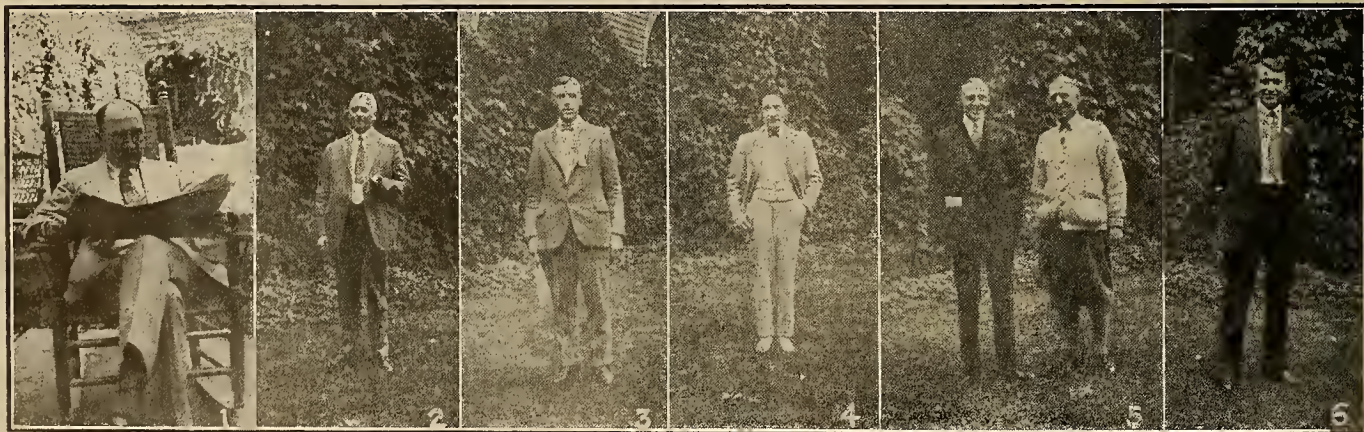
to take advantage of every opportunity to tell their story before public gatherings of any character. "The Value of Co-ordinated Effort in Publicity, Advertising and Public Relations Policies" was the subject of an address by George E. Lewis, executive manager, Rocky Mountain Committee on Public Utility Information, Denver. Mr. Lewis in describing the work of his committee stated that through the concerted efforts of the utilities to give the public correct information regarding their operations the public has been saved millions in the avoidance of litigation and controversy which might have been caused by ignorance of the utilities' problems.

The high lights of the program of this section were summed up by W. C. Sterne, president and general manager of the Municipal Properties Investment Company, Denver, and chairman of the section. Mr. Sterne urged that the industry feel that the public relations problem is not one of good relationship between the utility, its employees and the public but is a problem in human relations.

Commercial Section Meeting

Load-building and appliance advertising were the chief subjects of discussion at the commercial section meeting which was presided over by J. A. Clay, general manager of the Western Colorado Power Company, Durango, Colo., and chairman of the section. F. F. McCammon, manager, power sales department, Public Service Company of Colorado, Denver, and past chairman of the section, discussed the work of the various committees during the past year.

"New Opportunities Through Commercial Electric Heating" was the subject of an address by P. M. Parry, general commercial manager, Utah Power & Light Company, Salt Lake City. Mr. Parry described the electric installation in Shay's Cafeteria, Salt Lake City, an article on which is published elsewhere in this issue, and told of the method used in selling this restaurant complete electric cooking service. He also described the development of the bake-



Notables at the Rocky Mountain Division, N.E.L.A. convention, caught in unconventional attitudes between sessions of the busy conference. 1. E. A. PHINNEY, general convention chairman. 2. J. J. COOPER, vice-president and general manager, Mountain Electric Company, Denver, chairman of entertainment committee. 3. O. A. WELLER, Public Service Company of Colorado, secretary Rocky Mountain Division, N.E.L.A. 4. W. C. STERNE, president Municipal Properties Investment Company, Denver, third vice-president Rocky Mountain Division, N.E.L.A. 5. Left—W. KISSICK, president New Mexico Electrical Association, and right—W. P. SOUTHARD, manager Trinidad Electric Transportation, Railway & Gas Company, and president Colorado Public Service Association. 6. C. A. SEMRAD, vice-president and

oven load in Salt Lake City and discussed its advantages from a power load standpoint. He stated that a 150-kw. electric bake oven is now in progress of installation in one of the bakeries in his city. B. F. Rowley, district sales manager, Edison Electric Appliance Company, Salt Lake City, in discussing Mr. Parry's paper, told of the development of the electric range load in the territory of the Utah Power & Light Company.

The manner in which ranges and other electric appliances have been sold in the mining camps of Colorado was described in a paper entitled "Experiences in Developing Heating Load," by W. E. Fleetwood, district manager, Western Colorado Power Company, Telluride, Colo. Many of the mining camps in this section of the state have been electrified almost completely insofar as electric cooking is concerned, Mr. Fleetwood stated.

C. N. Stannard, vice-president and general manager, Public Service Company of Colorado, Denver, in an address emphasized the point that aggressive commercial policies can be made to promote good will for the utilities and at the same time develop new business.

The part played by advertising in merchandising appliances was described by E. K. Hartzell, assistant director of publicity, Public Service Company of Colorado, Boulder, in a paper, "Reaching the Prospect Through Advertising Copy." Mr. Hartzell discussed the merits of various kinds of advertising including newspapers, billboards, and direct-mail copy, and at the same time emphasized the difference in appeal which should be made in each class. He pointed out that unless merchandising copy was prepared by someone familiar with the subject advertising dollars were liable to be wasted.

The value of lighting load as compared to power load was discussed by Jerry Munroe, special representative of the Bryan Marsh Company, Cleveland, Ohio. Mr. Munroe described the national campaign which has been worked out by the industrial lighting committee of the N.E.L.A. and urged the power com-

panies in the Rocky Mountain states to tie in their sales programs with it.

Mr. Clay, chairman of the section, in summarizing the program pointed out that the commercial problems of the utilities in this section of the country differed from those of other utilities because many of the companies are small and many of the industries different. He urged the Commercial Section committees to organize with a view of preparing reports which would summarize each company's commercial problems for the benefit of other companies in the division. He announced that a general meeting of the Commercial Section of the Rocky Mountain Division will be held at Lake Electra, Colo., early next spring.

Technical Section Meeting

R. B. Hubbard, superintendent Western Division, Public Service Company of Colorado, Boulder, and chairman of the Inductive Co-ordination Committee, addressed the Technical Section on "Radio Interference and the Attitude of the Central Station Company." Mr. Hubbard classified various complaints of radio owners and pointed out that only a very small percentage of the troubles ascribed to the power companies were directly traceable to them. He described the various devices used for the detection of radio interference and told of some of the corrective measures which might be employed.

"Current Developments in Power Plant Equipment" was the subject of a paper by A. L. Jones, engineer, General Electric Company, Denver, in which some of the present generating and transmission problems of the industry were described. Mr. Jones told of the development of steam boilers to operate at 1,500 lb. per sq. in. in some of the large eastern stations and pointed out some of the problems the manufacturers were studying at the present time.

The value of accurate cost records for all phases of power plant operation was emphasized by R. F. Throne, mechanical engineer, Public Service Company of Colorado, Denver, and chairman of the Prime



general commercial manager, Public Service Company of Colorado, and president of the Rocky Mountain Division, N.E.L.A. 7. Left—G. O. HODGSON, General Electric Company, Denver, chairman of the golf committee, and right—J. E. LOISEAU, secretary Public Service Company of Colorado, and chairman of the Accounting Section. 8. J. N. CLAY, general superintendent Western Colorado Power Company, chairman of the Commercial Section. 9. A. C. CORNELL, manager Western Electric Company, Denver, treasurer of Rocky Mountain Division, N.E.L.A. 10. CHARLES L. BROCK, Denver attorney, one of the speakers on the program. 11. Left—PAUL LEE, attorney from Ft. Collins, Colo., and right—M. H. AYLESWORTH, managing director, N.E.L.A.

Movers Committee. Mr. Throne urged that careful periodic inspections be made of all plant equipment, irrespective of its performance, for the purpose of eliminating breakdowns which might result in service interruptions.

William Trudgian, central station representative, Westinghouse Electric & Manufacturing Company, Denver, described some of the recent developments in station and transmission equipment perfected by his company.

In discussing some of the overhead distribution problems in the Rocky Mountain region, M. M. Koch, superintendent of distribution, Public Service Company of Colorado, Denver, described the present railroad crossing contracts required of utilities in Colorado and urged that steps be taken to modify some of the requirements.

"More and Better Wiring" was the subject of a paper by S. W. Bishop, executive manager, Electrical Cooperative League, Denver, and chairman of the Wiring Committee. Mr. Bishop urged that the standard electrical ordinance as worked out by the Associated Manufacturers of Electrical Supplies be enacted in as many communities as possible. He stated that more and better wiring will lead to the use of more energy and its better application whether in lighting, heating or for power purposes. The meeting of the Technical Section was presided over by H. H. Kerr, superintendent electric department, Public Service Company of Colorado, Denver, chairman of the section.

Accounting Section Meeting

Public relations begin at the contract counter, in the opinion of C. E. Elliott, manager contract department, Public Service Company of Colorado, the first speaker on the Accounting Section program. Mr. Elliott described the qualifications of a contract clerk and told of specific instances where public relations have been improved by acts performed at the contract counter.

Machine billing was discussed by A. E. Obendorfer, specialist in machine billing, Henry L. Doherty & Company, New York. Henry Swift Ives, vice-president and secretary, Casualty Information Clearing House, Chicago, spoke on "Insurance, a Modern Business Necessity." J. E. Loiseau, secretary, Public Service Company of Colorado, Denver, chairman of the section, outlined the program of the section for the coming year.

Second General Session

W. P. Southard, general manager, Trinidad Electric Transmission Railway & Gas Company, Trinidad, Colo., and president of the Colorado Public Service Association, presided at the second general session Tuesday, Sept. 15. "Our Larger Idea of Service" was the subject of a paper presented by D. C. McClure, general superintendent, St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. Mr. McClure stated that the problem of the power companies was the development of a service conscience in the minds of every employee. He believed that the job of the utilities is the technical performance and selling of a service to the public, a

job in which the attitude of the employee plays an important part.

M. H. Aylesworth, managing director, National Electric Light Association, New York, reviewed some of the problems facing the electrical industry today. He voiced the imperative need for telling the real story of "Electrical America" to counteract the mass of misinformation that has been broadcast by futurists, theorists and self-seeking politicians.

J. C. Greenleaf, member of the Kansas Utility Commission, Topeka, Kan., was one of the feature speakers of this meeting. He described the work of the public utility commission in his state and pointed out some of the problems which have been met and solved. During the course of his address he warned the companies to use care not to impair the credit of the industry by undertaking developments and extensions not economically feasible. He urged the industry not to allow professional financial manipulators to undermine the splendid position the securities of the electric utilities enjoy with the public today.

"State versus Municipal Regulation" was the subject of an address by Charles R. Brook, Denver attorney, in which comparison was made between the present system of home rule of utilities in effect in Colorado today and state regulation as enjoyed by utilities in other states. He pointed out that the only way the present scheme of regulation in Colorado can be changed is through an amendment to the state constitution. He urged the utilities to tell the public of the advantages to be enjoyed under sound state regulation.

Edwin A. Bemis, field manager of the Colorado Editorial Association, Littleton, Colo., described the change that has come about between the newspapers and the utilities during recent years. He stated that the newspapers stand ready to back the utilities in any stand that is just and fair to the public.

The convention banquet was held Tuesday evening. J. E. Moorehead, Mountain States Telephone & Telegraph Company, Denver, acted as toastmaster. More than 250 were in attendance.

Third General Session Features Colorado River

Development of the Colorado River and the interests of the upper basin states featured the third general session, Wednesday, Sept. 16. The principal speaker was L. Ward Bannister, president of the Denver Chamber of Commerce and authority on the subject. Mr. Bannister, it will be remembered, acted as consultant to the commission which drew up the Colorado River Compact. In his opinion the development of the Colorado River is the gravest economic situation in the history of the states comprising the upper basin. He suggested two solutions to the present deadlock, first, a satisfactory interstate agreement to be drawn up by a new commission of representatives of states concerned, or second, a definite decision by the United States Supreme Court regarding the economic division of the waters of the river between states or between basins. Provided the states cannot reach an agreement among themselves, this latter course must be adopted, he declared, because of the inability of either Congress

or the Federal Power Commission to settle this question.

E. O. Leatherwood, Congressman from Utah, supported the stand taken by Mr. Bannister and sounded a note of warning to the upper basin states against the propaganda of California and Arizona. He accused California of being selfish in its attempt to force the Swing-Johnson Bill through Congress. The subject was further discussed by Edward Taylor, Congressman from Colorado. Further discussion was presented by Dr. D. S. Hill, president of the University of New Mexico, Albuquerque, N. M.

Further attention was given to the subject of state regulation by two speakers on this program. Paul Lee, attorney of Ft. Collins, Colo., spoke on "The Status of Utility Regulation," and Hylen Corey, of the Oregon Public Service Commission, Salem, Ore., told of the development of public regulation in that state, which is credited with having one of the most effective utility laws in the country. Attention was drawn to the uniform public utility law which has been drawn up by the United States Bar Association.

Evening Program Broadcast Over KOA

A vital message, "Insuring American Ideals," by Henry Swift Ives, was presented at Wednesday evening's meeting and broadcast over KOA, the General Electric Company's Denver station, through the cooperation of the Mountain States Telephone & Telegraph Company.

The work of the Rocky Mountain Committee on the Relation of Electricity to Agriculture also was described at this meeting by Dr. Charles A. Lory, president of the State Agricultural College, Ft. Collins, Colo.

Third General Session

What the electric railways may look for in 1930 was the topic of an address by E. A. West, general manager of the Utah Light & Traction Company, Salt Lake City, at the third general session Thursday, Sept. 17. Mr. West predicted that the present problems confronting the street railways will have been solved at that time and that again they will be enjoying an era of prosperity.

The history of municipal and state ownership on the Pacific Coast was discussed by George C. Tenney in a paper entitled "The Pacific Coast Verdict by Ballot." Mr. Tenney described the California Water and Power Act and the Bone-Erickson Bill as presented in Washington at the last election and drew attention to some of the lessons the utilities have learned from these measures. Customer-ownership and an open and fair attitude on the part of the utilities in taking the public into their confidence are the two strongest factors at the disposal of the power companies in combating such movements he stated.

Miss Isabell Davie, chairman, Women's Committee, Middle West Division, N.E.L.A., Des Moines, Iowa, told of the advantages to be derived from properly educating women employees and urged utilities which have not done so to organize women's committees.

O. P. Anderson, commercial engineering department, Edison Lamp Works, Harrison, N. J., discussed the progress in illumination since the invention of the carbon filament lamp and described the lamp standardization program which has been adopted by Mazda lamp manufacturers.

The women attending the convention held one session in which the work of the Women's Committee was the chief topic of discussion. Miss Inez Thompson of the Public Service Company of Colorado presided and the speakers were Mrs. Arthur Prager of Albuquerque, N. M., Miss Isabell Davie of Des Moines and Miss Thompson.

Election of Officers

At the business meeting of the Rocky Mountain Division, N.E.L.A., Arthur Prager, general manager, Albuquerque Gas & Electric Company, Albuquerque, N. M., was elected president to succeed C. A. Semrad, whose term expires July 1, 1926. Other officers elected were: First vice-president—Clare N. Stannard, vice-president and general manager, Public Service Company of Colorado; second vice-president—E. P. Bacon, general manager, Midwest Public Service Company, Casper, Wyo.; third vice-president—W. C. Sterne, president and general manager, The Municipal Properties Investment Company, Denver; secretary—O. A. Weller, budget director, Public Service Company of Colorado; treasurer—A. C. Cornell, manager, Western Electric Company, Denver.

Members at large are K. W. Kissick, manager, Deming Ice & Electric Company, Deming, N. M.; F. F. McCammon, Public Service Company of Colorado, and J. J. Withrow, president and general manager, Sheridan County Electric Company, Sheridan, Wyo.

E. F. Stone, superintendent, Southern Colorado Power Company, Pueblo, was elected president of the Colorado Public Service Association to succeed W. P. Southard. Other officers of this organization are: First vice-president—J. F. Greenawalt, publicity manager, Mountain States Telephone & Telegraph Company; second vice-president—Howard S. Robertson, general manager, Denver Tramway Corporation; secretary-treasurer—O. A. Weller, Public Service Company of Colorado.

The New Mexico Electrical Association, which met jointly with the other two organizations, will hold its annual meeting and election of officers at Albuquerque in February, 1926.

Entertainment

Elaborate entertainment provisions were made both for the men and the women attending the convention. The program was so arranged that meetings were held only in the mornings, leaving the afternoons free for recreation. One of the features of the convention was the golf tournament, which extended over a three-day period. The women of the convention were presented with favors consisting of silver candlesticks. Many of the women commented upon the electric traveling irons presented as mementos of the convention by B. F. Rowley, district manager of the Edison Electric Appliance Company, Salt Lake City.

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Standardized Meter Houses for Outdoor Service

Power Supplied for Mining Purposes from Outdoor Substations Accurately Metered by Well Housed Equipment

By E. C. FERREE, Electrical Superintendent, The Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Colo.

Outdoor mine power substations present metering problems which have been met successfully by The Trinidad Electric Transmission, Railway & Gas Company, as shown in the accompanying illustration. The installation shown is a secondary metering outfit which has been standardized by the company for this class of service. In this particular instance the installation happens to cover two complete metering sets, there being installed at the same location two banks of three single-phase transformers each supplying 440-volt, 3-phase, 60-cycle service.

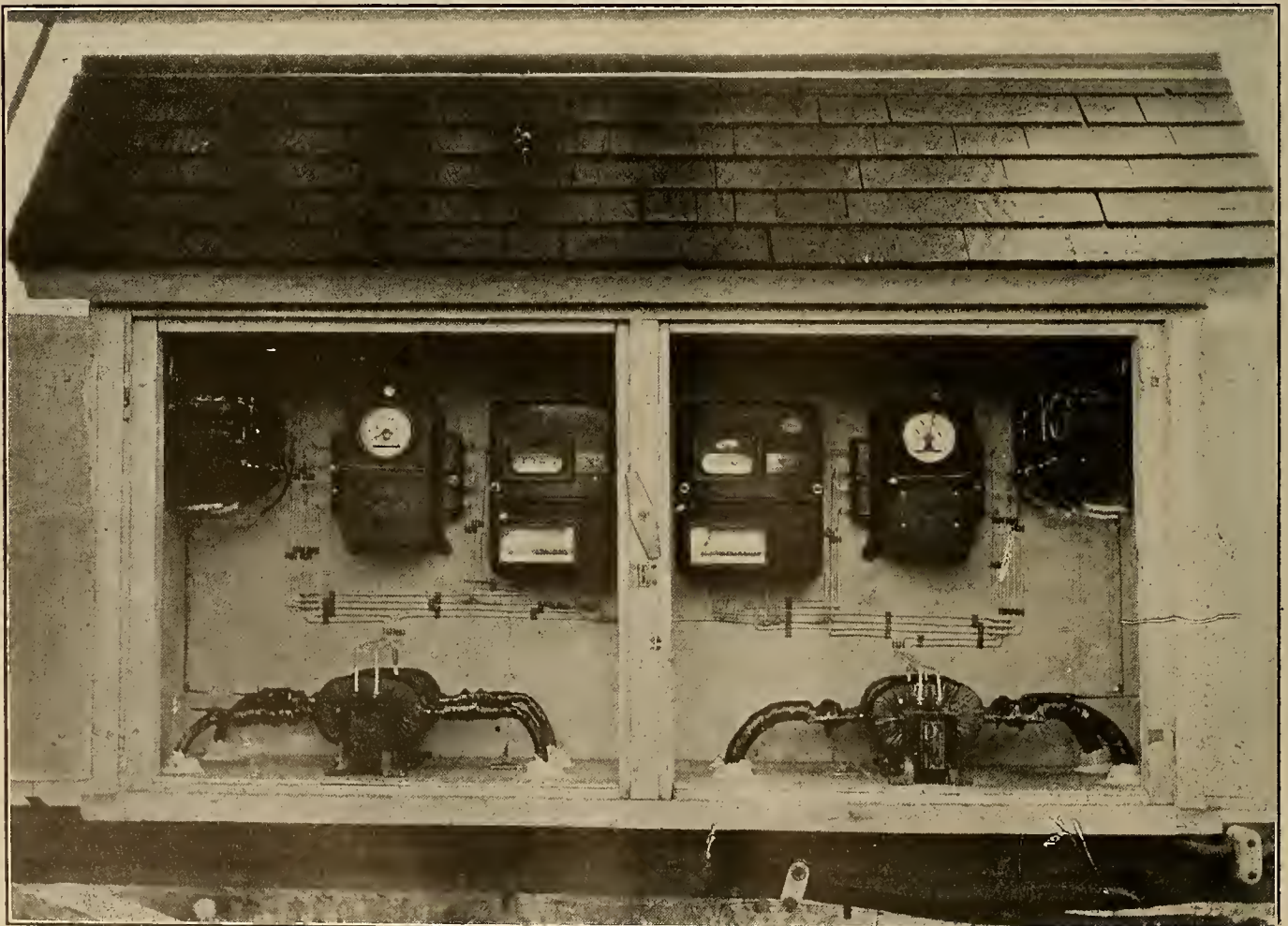
It will be noted that the entire metering equipment is enclosed in the little

house. This house is lined completely with $\frac{1}{4}$ -in. asbestos board, is made weatherproof and as nearly dustproof as is possible to make it. Dimensions are no larger than necessary to house conveniently the metering equipment. The main leads to the current transformers are brought through porcelain bushings. The space between the leads and the bushings in each case is filled with a thin layer of plaster of paris to keep out dust, moisture and small insect and animal life. At the same time this plaster plug may be broken out easily should it be necessary to rearrange the leads in any way. Current transformers are mounted on the floor

of the house, as may be seen, and the potential transformers are mounted on the wall at either end of the house. This makes efficient use of the space available and aids in segregating the different leads.

Two meters are used in connection with each installation in the particular case shown. One meter is a check against the other although both meters in each circuit are connected to the same set of current and potential transformers. It will be noted that one of the meters is a Westinghouse type RA integrating-watthour, graphic-demand meter while the other is a Westinghouse type RO integrating-watthour, indicating-demand meter. Both meters operate on a 10-min. time interval.

By close inspection of the illustration it may be noted that there are three lights directly above the indicating demand meter. These lights, called phase lights, are connected to the potential transformers and used in testing power conditions. They are normally left partly unscrewed in the socket.



Asbestos-lined meter house used for outdoor locations in mining region

Problems of Modern Power System Operation

Accurate Forecasting of Loads Necessary to Enable Economic Use of Stored Water and Steam

By F. B. LEWIS, Assistant General Manager, Southern California Edison Company, Los Angeles

A certain amount of steam generating capacity is provided generally on large power systems, though they may be primarily hydroelectric. The exact percentage of steam to total capacity is dependent upon many conditions peculiar to the system in question, but it ranges in the opinion of many engineers from 20 to 35 per cent.

Steam generation is the most economical way in which to provide stand-

ing the months of April, May, June and July.

During this run-off season there is sufficient capacity in the stream-flow plants to carry the entire system load, and the steam plants are operated only from 7 a.m. to 10 p.m. to carry the peak loads and to furnish voltage regulation. The plants using the stream-flow energy are put on block loads, and the system regulation is done with the

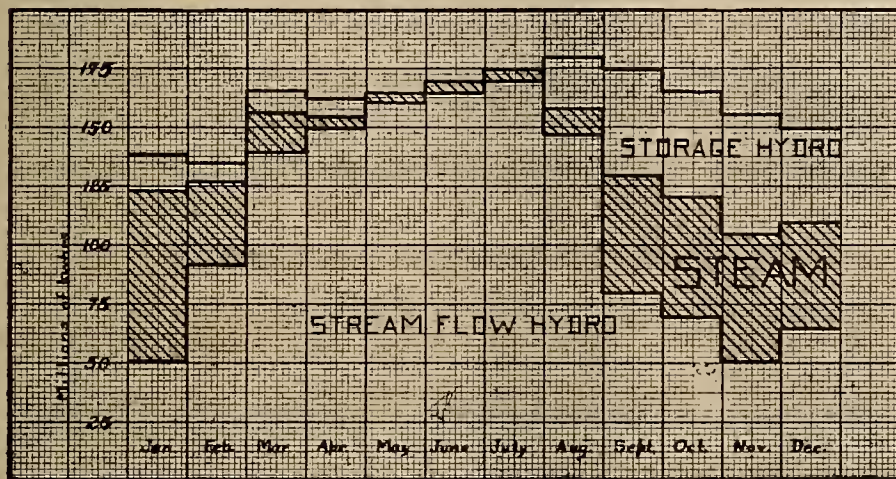


Fig. 1—Estimated monthly output in kw-hr. of the generating resources of the Southern California Edison Company for the current year.

by service against the failure of other generating units or plants. Likewise it is the most economical way to provide for growth of load.

The manner in which steam plants are operated in conjunction with the predominating hydro plants is a matter of some interest to operating engineers. The maximum over-all economy in the operation of the entire generating system naturally is accompanied by the utmost use of all of the available water power, and therefore the minimum use of the steam plants. This results in a rather poor annual load factor on the latter.

Fig. 1 illustrates the estimated monthly output in kw-hr. of the generating resources of the Southern California Edison Company during the current year. This shows the variations during the year and the power available from the stream-flow plants, the output of which naturally reaches a maximum during the run-off period of May, June and July and a minimum during the months of November, December and January.

Storage water available is made use of in order to produce the best over-all economy for the entire system and likewise to permit the best possible daily load factor on the steam plants because the economy of the latter varies directly with the load factor placed upon them.

This chart illustrates the estimated output of the company's steam plants during the current year. It will be noticed that there is considerable variation in such output, the maximum occurring in the month of January and the minimum in the run-off season dur-

ing the months of April, May, June and July.

There usually is a period of about one of two months just before and just after the maximum run-off period when it is necessary to run the steam plants on varying block loads or possibly to take them off entirely at night and regulate by one of the storage-water plants. This results in good steam-plant economy and requires the use of only a small

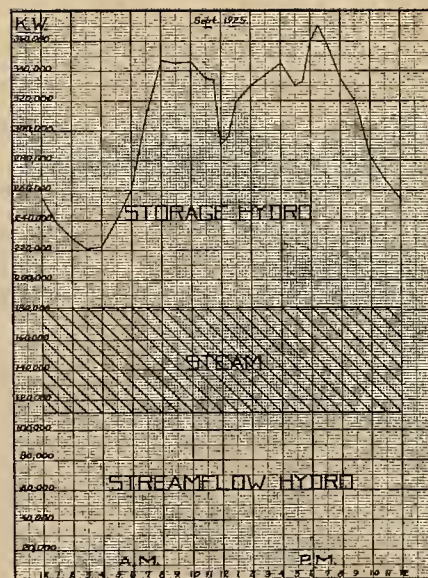


Fig. 2—Characteristic average daily load on the system of the Southern California Edison Company as predicted for the month of Sept., 1925

amount of storage water. During the balance of the year the speed regulating is done with one of the storage-water plants, the operator controlling the governor which feeds the water wheel more or less water depending upon the load requirements.

Fig. 2 illustrates the characteristic day load as predicted for the month of September, 1925. It illustrates also the power available from stream-flow plants and the way in which steam plants are operated. At the maximum possible load factor such plants are given a block load equivalent to the most economical load for the units which must be employed and the variations are taken by the storage-water plants. This method provides better over-all economy than that of giving block loads to the storage-water plants and regulating with the steam plants.

It is necessary to obtain all possible data on load requirements and on the water power available in order to predetermine the amount of storage water which it is safe to use each month and thus schedule the amount of steam power to be operated.

Melting Pot Cross-Sectioned in Employment Office

Characteristic Traits of Human Nature Make Routine Duties of Employment Interviewer More Interesting

By R. G. KENYON, Assistant Supervisor of Employment, Southern California Edison Company

Every employment office which makes any pretense of having the right man ready for the right job at the right time has some system of classifying applicants according to vocation or experience. There is a much more interesting classification possible, however, and that classification is based purely upon the human equation.

There are certain erroneous thoughts prevalent in the minds of men seeking work. Some of these thoughts are held in common by the great majority; others are entertained by a chosen few. The effects which these erroneous thoughts have upon different types of applicants is a great help in making the hours pass quickly for the interviewer.

There is, for example, the classic myth that "with a payroll as large as your company's there must be at least one job open somewhere." The degree to which this belief has grown in the mind of any given applicant is in inverse ratio to his current cash assets.

Then there is the old-fashioned man who carries with him a well thumbed set of laudatory epistles from former employers. This type is disappearing but it dies hard. There is something so eminently satisfying about a letter that extolls good qualities and fails to mention any others that it is very unlikely that this practice ever will be thrown wholly into the discard. Closely allied to this man is the applicant who comes armed with a letter from a friend of the

G.M. which states among other things that "anything you can do for the bearer will be greatly appreciated by the writer."

There is little need to add that this is a tremendous help to the interviewer in classifying and codifying the applicant for future use, particularly so with reference to such qualities as self-reliance, initiative, and aggressiveness.

There is also the youthful prodigy brought in by his fond parent. It is readily apparent that the f.p. brings the boy in primarily for display purposes as he does all the talking himself and does not give the boy an opportunity to say a word. If these boys really have performed one-half the feats claimed for them by these proud parents the electrical world is certainly due to harvest a fine crop of genius in this next generation. "All this boy wants is a starting place and he'll soon show what he has in him," is one of the favorite parting shots of this brand of caller.

Occasionally a man and his wife call together, the man seeking employment. Some wives step right up into the front line trenches and help him seek while others remain with the reserves in the outer office and justify their presence, to their own satisfaction at least, by lending their moral support to the husband on the firing line.

All of the above have been applicants who have enlisted some support in their campaign to get work. A second and far larger group is made up of those applicants who enter the employment office "unhonored and unsung" with just one idea in mind—to get work. This group grades all the way from the high-powered experienced central station man down to the high school senior who hopes to graduate in June when positions are few. The old-timers are rather difficult to handle as it is next to impossible to convince them of the undesirability of placing a man in a position too far below his actual grade and ability. The great majority of the younger men who more recently have left school or college are an easier problem to handle. Many of them have some objective in mind, and those who have no definite goal are usually willing to be shown.

The applicant who "can do anything" is always an interesting number on the day's program. It is relatively an easy matter to bring him down to earth as a few simple questions serve to establish the facts in the case. Either he has "never done much in the electrical line but has always wanted to get into it," or "he has done quite a bit of electrical work such as house-wiring and building radio sets." In any event he is usually quite ready to modify his original "can do anything" to "will try anything."

The European engineer just new in this country presents a case calculated to arouse sympathy. He may have a technical training which would make him a very useful man to an organization, but his inadequate knowledge of English makes it very difficult to use him. The average American-born engineer is far from being the best salesman in the world when it comes to selling his own services, but he at least can speak the language.

Then there is the real salesman who has always sold things, not the least important of which has been himself.

This man steps in snappily, makes it absolutely obligatory for the interviewer to shake his hand, puts on the "How good am I" record, and proceeds to spread himself.

This list could be almost prolonged indefinitely, each class of applicants having its own outstanding peculiarities, but the types delineated are representative of a day's grist in a busy office.

When general business conditions are on the rise and labor turnover is fairly high, the interviewer takes on some of the attributes of Santa Claus and is in a fair way to become the most popular man in the organization. When business conditions are quiet and such a thing as "turnover" hard to find, just the reverse is true. Applicants are very apt to be obsessed with the idea that there are positions open, but that for some unknown reason the interviewer does not wish to fill them. Ambassa-

dorial finesse is crudity itself compared to the diplomacy which must be used by the employment man to send this type away jobless but satisfied.

The employment interviewer is in a splendid position to get an accurate cross-section picture of human nature as it is, and from his point of vantage he is frequently able to render great service to many applicants irrespective of whether or not he is able to place them with his organization.

There is a justifiable feeling of satisfaction that comes from knowing that possibly the discussion of the personal attributes of some applicant with that applicant has resulted in his obtaining a better measure of his true abilities.

The opportunity to view close up and at first hand those representative of practically every class, quality and nationality of human being prevents the work of the employment interviewer from becoming humdrum routine.

Emergency Steam-Electric Plant Mounted on Tug Deck Used as Generator Floor and Mast as Transmission Tower Tug Serves as Emergency Central Station

By M. T. Crawford, Superintendent of Distribution, Central District, Puget Sound Power & Light Company, Seattle, Wash.

During a storm on Puget Sound Dec. 16, 1924, the three-mile 6,600-volt cable from Seattle to Vashon Island broke down. An attempt to repair it in place was unsuccessful, owing to the rough weather and to the extent of the damage. The cable therefore was reeled up and brought to Seattle for repairs. This cable is composed of three No. 6 stranded-copper conductors rubber insulated and encased in armor. Fourteen breaks were found and repaired by cutting out the damaged portions and splicing the conductors in each case. On re-laying the cable, however, it was found that prior repairs had weakened it mechanically to the extent that it would not withstand the tension to which it was subjected in the process of laying and on being put into service

burned open in unexpected places. It was necessary to reel the cable up, repair it and relay it three different times before it was made to hold. In the meantime a new cable was ordered to duplicate the old one.

When it was found that the old cable could not be repaired in place, the country was scoured for some form of generating equipment that could be set up quickly to furnish temporary service to the island inhabitants. After extensive search a 200-hp. McEwan engine direct-connected to a 150-kva., 440-volt, 3-phase Ridgway generator was procured and was mounted on the tug Roosevelt which was lying idle in the Seattle harbor. A steam connection then was made from the tug's boilers to the engine. It is interesting to note

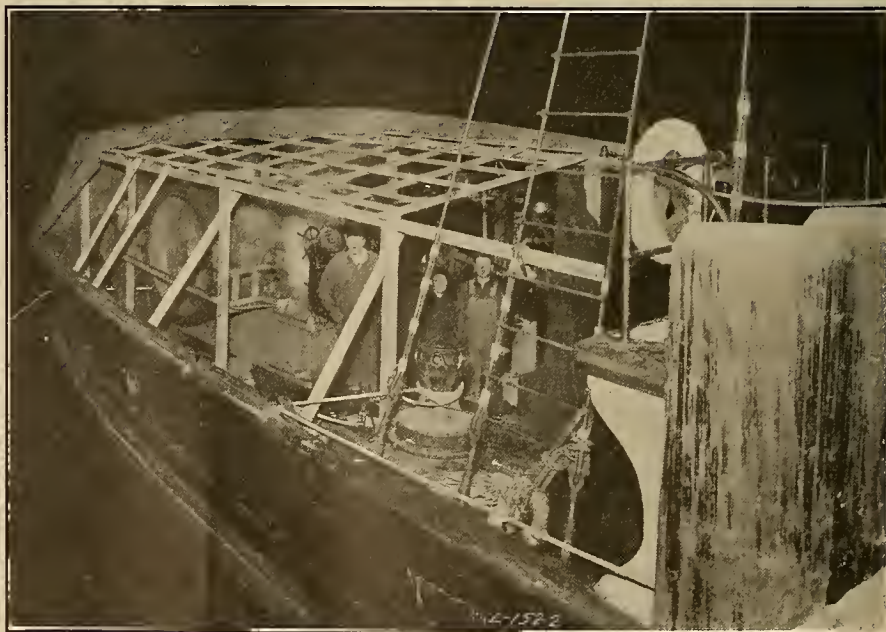


Fig. 1—Tug Roosevelt equipped with generator and serving Vashon Island, Puget Sound, while repairs are being made to the submarine cable which normally supplies this service from the system of the Puget Sound Power & Light Company. The mast serves as the transmission tower.

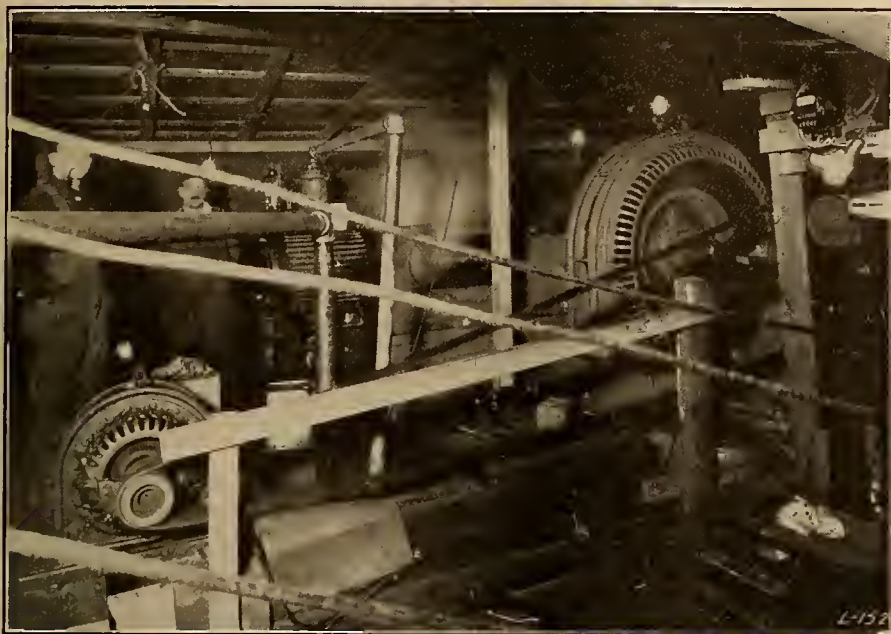


Fig. 2—Emergency service supplied by 200-hp. McEwan steam engine direct-connected to 150-kva., 440-volt, 3-phase Ridgway generator. Steam is supplied from the boilers of the Roosevelt.

that the Roosevelt was the flagship of Admiral Peary on that explorer's first successful trip to the North Pole fourteen years ago, and was built with a hull 3 ft. thick to enable it to withstand ice jams.

The tug was moored to a dock on the island, and connection was made with the island distributing system through a bank of three 75-kva., 440/2,300-volt transformers mounted on the deck of the tug. The primary risers were carried from here up the mast of the tug and jumped by a short span to a pole on shore to which a short 2,300-volt tap line had been run from the nearest point in the distributing system.

The Vashon Island electric property serves a population of some 4,000 or 5,000 persons. It was acquired by the Puget Sound Power & Light Company from the West Coast Utilities Company last year. The business is principally in domestic lighting of rural homes and of country homes of Seattle business

people, though there is a considerable amount of small power used in greenhouses, chicken houses and for such domestic purposes as cooking and pumping. The temporary plant was found adequate at all times except for a short period of the day when the lighting peak overlapped the working day of the only large power user, a gravel pit. At this time it was necessary to drop this customer's load temporarily. It readily will be understood that the cost of running the temporary power plant greatly exceeded the gross revenues received from the island business. In fact the costs were four times the revenues. However, this case was one in which service to consumers is to be considered above operating costs. In equipping the tug and making the plant ready for service, three shifts were worked with the expectation of restoring service by Christmas. Service was actually restored Dec. 23, just seven days after the original cable-fault occurred.



Fig. 3—Three miles of 6,600-volt, 3-conductor cable laid out on the dock of the Drummond Light-erage Company, West Seattle, Wash., for repairs. The cable is an old one, and much trouble was experienced in getting it re-laid for service. Note the tent to house the splicers

Long-Range Load Indicator for Steam Power Plants

A 250-ft. range of visibility is possible with the new power indicator recently brought out by the Westinghouse Electric & Manufacturing Company. This indicator is designed primarily for use in boiler rooms for indicating the total load of a power station. Many different types of load indicators for this service have been developed by engineers in various parts of the country, but few have been genuinely satisfactory.

This new indicator is of the relay type. The pointer is driven by a small motor which is energized through the contact of the measuring element. The case of the device is constructed of sheet steel and angle iron designed to be rigid and dust-tight. All windows are of heavy plate supported in a cushion mounting to prevent damage from vibration. Dials are black with white figures, and this makes it very easy to illuminate the dial satisfactorily by means of lamps concealed within the case. Doors in the case itself permit easy access for replacement of lamps and for the lubrication of the moving parts when such is required. The case is about 72 in. square on the face sides and 30 in. in depth. Either single or double face may be provided.

This indicator may be furnished with a polyphase wattmeter element to operate from the totalizing current transformers, or may be supplied with a direct-current ammeter element to operate from a remote metering apparatus,

State Court Upholds Spokane Judge on Power Ruling

The Washington state supreme court on Sept. 3 handed down a decision affirming judgment of Judge Blake of the Spokane County superior court in dismissing an action brought against The Washington Water Power Company of Spokane and the Modern Electric Water Company of Opportunity, Wash., and others by the Opportunity Christian Church and others seeking to compel the power company to furnish the church with electric energy for power purposes.

In affirming judgment of the Spokane County court the supreme court held that the lower court was right in ruling that the Opportunity Christian Church, as minority stockholders in the Modern Electric Water Company was not in a position to bring a suit against The Washington Water Power Company to compel the company to furnish it with power, when majority stockholders of the Modern Electric Water Company had voted against bringing the suit.

The supreme court also upheld the trial court in its ruling that the action could be maintained only by the Modern Electric Water Company and not by the minority stockholders, for which reason the lower court dismissed the suit.

Inception of the action grew out of the fact that certain residents of Opportunity sought to compel The Washington Water Power Company to furnish them with electricity for power purposes, while The Washington Water Power Company's contract with them called simply for furnishing residents of the district with electric energy to operate their wells and to furnish electricity for the usual domestic purposes.

IDEAS FOR THE CONTRACTOR

Multi-meter Cabinet Saves Space in Installations

Contractors Use Cabinet to Provide Adequate Room for Switches and Meters in Apartment Houses

Sufficient space frequently is not allowed in apartment house buildings to provide adequately for the installation of switches and meters for each apartment. Space in such buildings is valuable, and owners and builders do not like to allow any more for equipment than is absolutely necessary. A multi-meter cabinet is being manufactured by

larger installations it is possible to mount two of the cabinets back to back and install them away from the wall. By this method a board 30 in. wide, 55 in. high and 16 in. deep would be of sufficient size for a 50-meter job. Eleven inches is allowed to a tier of meters.

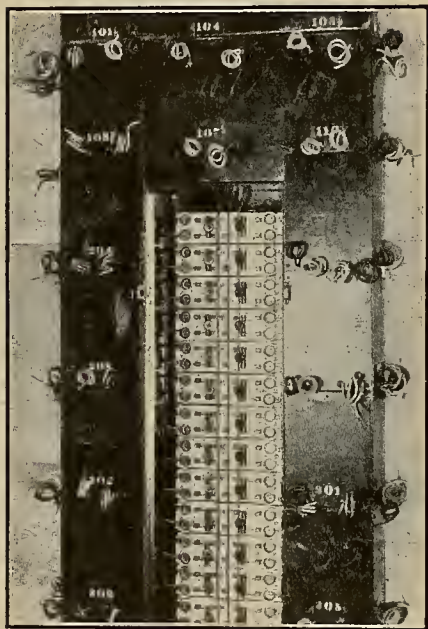
Stipulated Price Established on Ornamental Street Lights.—Falling in line with the recent request of the city council of Los Angeles that all manufacturers of ornamental street lights cooperate with the city engineer in creating competition and securing a reduction in costs of installing lights, the Marbelite Corporation of America, whose main office is in Los Angeles, has offered to furnish its products to that city or to private contractors at a stipulated price for one year. This fixed price schedule on patented Marbelite products will confine competitive bids to the actual costs of installing the

lights, it is pointed out, and make it possible to make accurate estimates of costs before calling for bids.

Modern Irrigation System of the Salinas Land Company

The Salinas Land Company, King City, Calif., has one of the most modern electrical irrigation systems to be found in the state. At the present time it has approximately 5,000 acres planted with beans and peas, all of which are under cultivation. It has twelve pumps connected to wells and one booster pump.

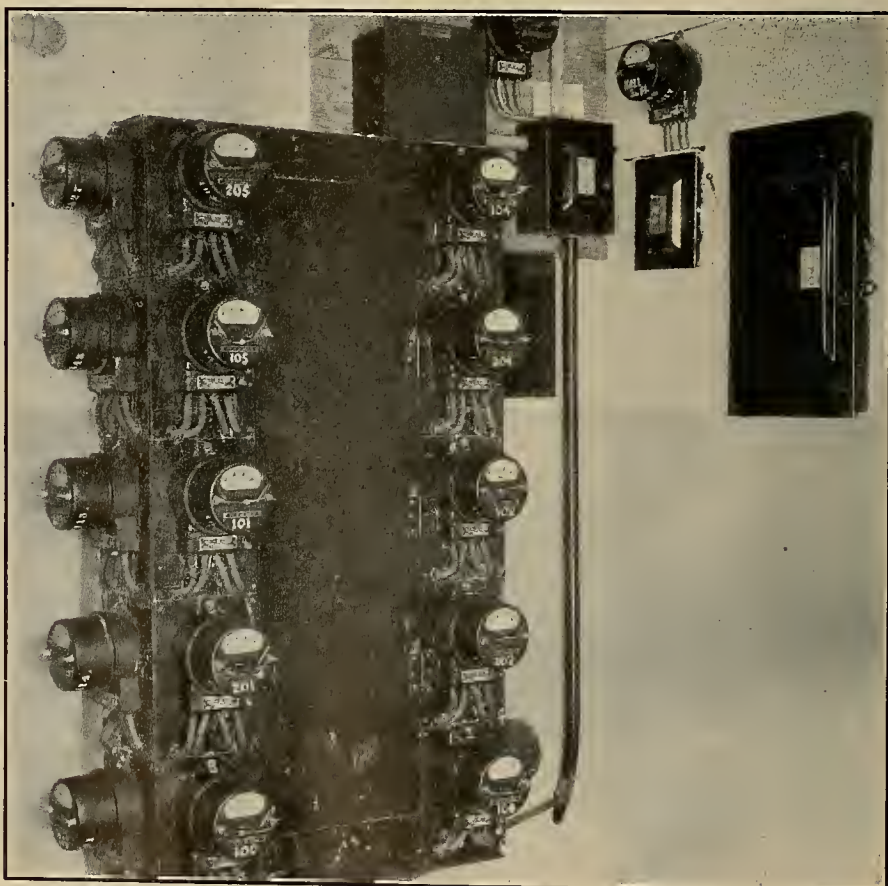
The pumps range in size from 8 in. for the booster pump and from 12 in. to 16 in. for the regular pumps. All of these are of the deep-well turbine type. They are operated with motors from 40 hp. for the booster pump and from 75 hp. to 125 hp. on the others. The company has a variety of makes of pumps and motors, including Byron Jackson, Layne & Bowler, and Fairbanks-Morse pumps; and Westinghouse, General Electric, Allis Chalmers and Fairbanks-Morse motors. Three-phase current is supplied at 440 volts. The accompanying table shows an itemized



Installation of multi-meter cabinet by Hill Electric Company in Cooper Apartments, Los Angeles, showing switches and board before mounting meters. This cabinet will have thirty meters mounted upon it

the Peccop Manufacturing Company, 4575 Santa Monica Boulevard, Los Angeles, which is meeting this condition successfully. The accompanying pictures show views of two different installations of this cabinet. It will be seen that it is much more compact than the average installation where an externally operated switch is used with a metal gutter. It not only makes a good electrical installation occupying less space but also makes a cheaper installation from the standpoint of the electrical contractor.

The cabinet is made of 14-gage iron mounted on a heavy angle-iron frame. Switches for each meter are mounted in a central compartment. Openings for the meter leads are brass bushed to prevent abrasion. The cabinets ordinarily are mounted against the wall. A board 30 in. wide, 76 in. high and 8 in. deep mounted in this manner is large enough to accommodate 30 meters. In



Multi-meter cabinet installed in Sahara Apartments, Los Angeles, by A. S. Tyler. This cabinet is large enough for 20 meters, although only 16 actually are mounted upon it. Note the great saving in space

list of the various pumps and motors installed.

Tests recently were made of all of the plants on the ranch to determine their efficiency. These tests recently were conducted by the University of California under the supervision of C. N. Johnston, assistant in irrigation investigations and practice, and E. J. Stirniman. Many interesting results were obtained, among them the variations found in line voltage.

One of the most interesting developments recently made on the ranch was the grouping together of four pumping plants so that all the power will be

charged on one master meter. There are four 125-hp. motors and one 100-hp. motor in this group. An air chamber is provided in the distributing water line to take the water hammer. Pressure is maintained in this by means of a 440-volt, 3-phase, 1-hp. U. S. motor operating a Curtiss air compressor; this is located in the pump house. A Sentinel irrigation meter measures the water supplied by each pump. It is expected that the present grouping of the four motors under a master meter will effect a material economy in operating costs.

The electrical work was installed by

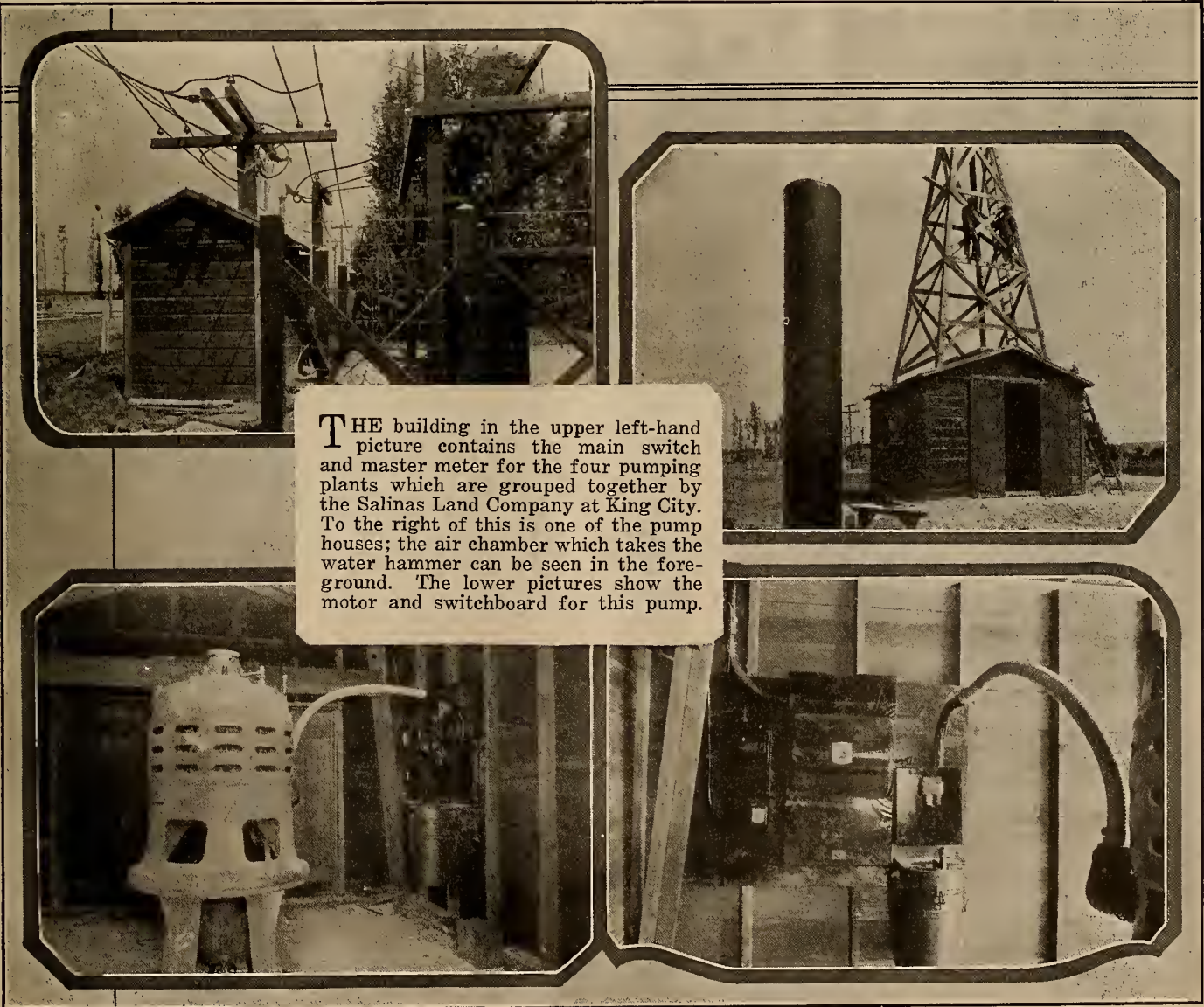
George Slavich of the King City Electric Works, King City. The main switch has a capacity of 1,000 amp. at 500 volts, and is supplied with three 750,000 cir. mil cables in a 3½-in. conduit. The main switch, current coils and meter are installed in a small building erected for this purpose adjacent to the bank of transformers.

As two of the pumping plants are located on the opposite side of the highway from the meter house, an overhead cross-over line has been built to supply them with service. Standard materials have been used throughout, and the installation is one which might well be followed by anyone making one similar. When completed the interior of all of the pump houses will be painted white and the exterior will be painted green.

Table showing pumps and motors installed on the ranch of the Salinas Land Company, King City, Calif.

Pump No.	Make	Size	Motor	Hp.
1	Byron Jackson	12-in.	Fairbanks-Morse	75
2	Layne & Bowler	16	General Electric	75
4	"	16	Westinghouse	75
5	"	16	Allis-Chalmers	75
7	"	12	Westinghouse	100
8	"	16	"	100
9	"	16	"	125
10	"	16	"	100
11	"	16	"	100
12	"	16	"	125
14	"	16	Fairbanks-Morse	125
15	"	16	Westinghouse	125
	Booster, Fairbanks-Morse	8	Fairbanks-Morse	40

Safety Orders Are Now Available.—The 1925 edition of the Electrical Safety Orders of the Industrial Accident Commission of the State of California is now ready for distribution. Copies may be secured by making application to the commission, State Building, San Francisco. Several thousand applications are now on file, and these are being filled as rapidly as shipments of the Orders are received from the state printer.



Electrical Estimating for the Contractor — IV

The Making of an Electrical Layout for a Typical Small Power Installation Is Continued in This Article

By J. R. WILSON*, Engineering Department, Los Angeles Electric Works

In the Sept. 1 issue of the Journal of Electricity (p. 180) we started to make an electrical layout of a typical small power installation.

Referring to Fig. 3, we have the set-up of the sub-switch board. Also Fig. 4 gives the set-up of the equipment at the test plug board, and Fig. 5 gives a schematic one-line drawing of the wiring layout. Fig. 6 shows reversing switch layout and control button at lathe.

It will be noted that the wiring to the test plug board is laid out in a run of 9 No. 14 wires in a 1-in. conduit. This could have been laid out as a sub-feeder of 3 No. 8 wires in ¾-in. conduit, but

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would have required an additional 60-amp. switch to protect this sub-feeder. It also would have placed the individual plug switches at the test plug board and would have increased the size to a considerable extent.

Fig. 7 shows the termination of the ground line in a "safety" bus clamp. This is a 4-bolt cast iron clamp, spheradized, and can be obtained in various sizes to meet almost every requirement. The writer uses these clamps (because they necessitate using only one pipe as a "bus" ground line), fastening both service and equipment ground straps to the one pipe as shown on Fig. 2.

Fig. 8 shows our "take off" sheet on this job, and Table IV shows very

TABLE IV

Date.....6/24/25.....			
Name.....JOHN DOE MACHINE WORKS.....			
Address.....917 Blank Street.....			
Quantity	Size	Material	Cost
1	No. 20053	S.O. switch	
2	No. 10053	S.O. switch	
1	No. 6053	S.O. switch	
7	No. 3053	S.O. Switch	
1	No. 3053	N.F. Switch	
3	200-A 600-V	Cart. fuses (N.R.)	
3	100-A 600-V	Cart. fuses (N.R.)	
3	65-A 600-V	Cart. fuses (renewable)	
3	50-A 600-V	Cart. fuses (renewable)	
3	30-A 600-V	Cart. fuses (renewable)	
12	25-A 600-V	Cart. fuses (renewable)	
3	15-A 600-V	Cart. fuses (renewable)	
3	5-A 600-V	Cart. fuses (renewable)	
6	65-A 600-V	Renewal links	
6	30-A 600-V	Renewal links	
24	25-A 600-V	Renewal links	
6	15-A 600-V	Renewal links	
6	5-A 600-V	Renewal links	
5-ft.	2-in.	Black conduit	
	1¼-in.	Black conduit	
	1-in.	Black conduit	
	¾-in.	Black conduit	
	½-in.	Black conduit	
60-ft.	1/0	DBRC stranded wire	
	No. 2	DBRC stranded wire	
	No. 6	DBRC stranded wire	
	No. 8	SBRC solid wire	
	No. 10	SBRC solid wire	
	No. 14	SBRC solid wire	
10	2-in.	Lock nuts	
12	1¼-in.	Lock nuts	
18	1-in.	Lock nuts	
28	¾-in.	Lock nuts	
100	½-in.	Lock nuts	
5	2-in.	Bushings	
6	1¼-in.	Bushings	
9	1-in.	Bushings	
14	¾-in.	Bushings	
50	½-in.	Bushings	
1	2-in.	Blk. cond. ell & coup.	
2	1¼-in.	Blk. cond. ell & coup.	
2	1-in.	Blk. cond. ell & coup.	
1	¾ x ½-in.	Ground clamp	
10		Ground bolts	
10-ft.		Ground strap	
12-ft.	4 x 4-in.	Gutter	
4	4 x 4-in.	Gutter ends	
1	18 x 30 x 10-in.	Meter can	
5-ft.	¾-in.	Greenfield	
10-ft.	½-in.	Greenfield	
4	¾-in.	Greenfield connectors	
8	½-in.	Greenfield connectors	
1	2-in.	Straps	
2	1¼-in.	Straps	
4	1-in.	Straps	
11	¾-in.	Straps	
17	½-in.	Straps	
1	E 6	Condulet	
1	A 3	Condulet	
1	No. 63	Condulet cover	
1	No. 53	Condulet cover	
2	2-in. x 3-in.	Nipples	
2	1¼ x 3	Nipples	
3	1 x 3	Nipples	
3	¾ x 3	Nipples	
29	½ x 3	Nipples	
1	¾ x 6	Nipples	
1	½ x 6	Nipples	
1 gross	1 x 9	F.H. wood screws	
Meter board materials allow.....\$ 2.50			
Sundries 2.00			
Inspection 14.50			
Labor \$.....			
Cost \$.....			
Overhead 23% Plus 50%			
Profit 10%			
Selling price.....\$.....			

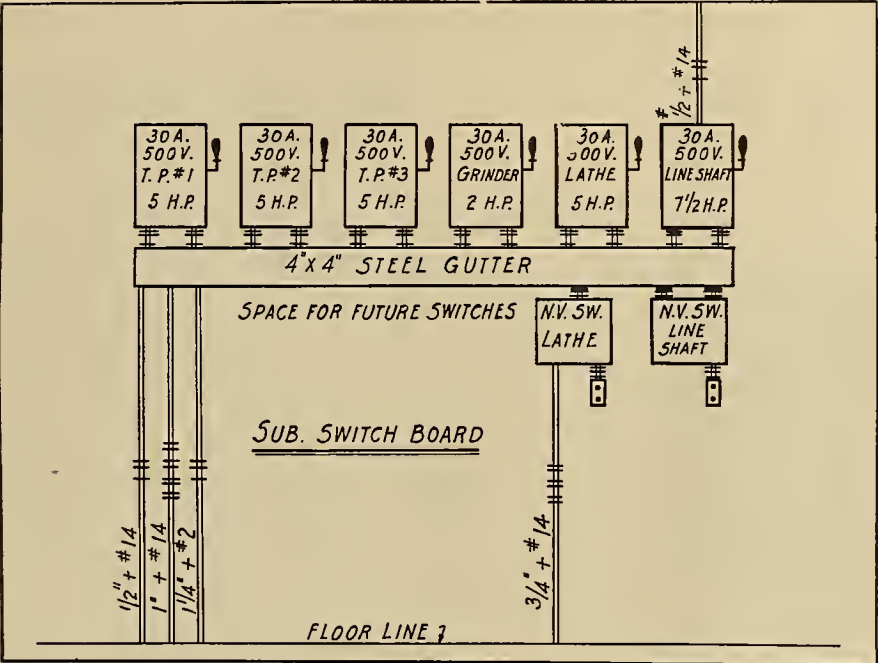


Fig. 3

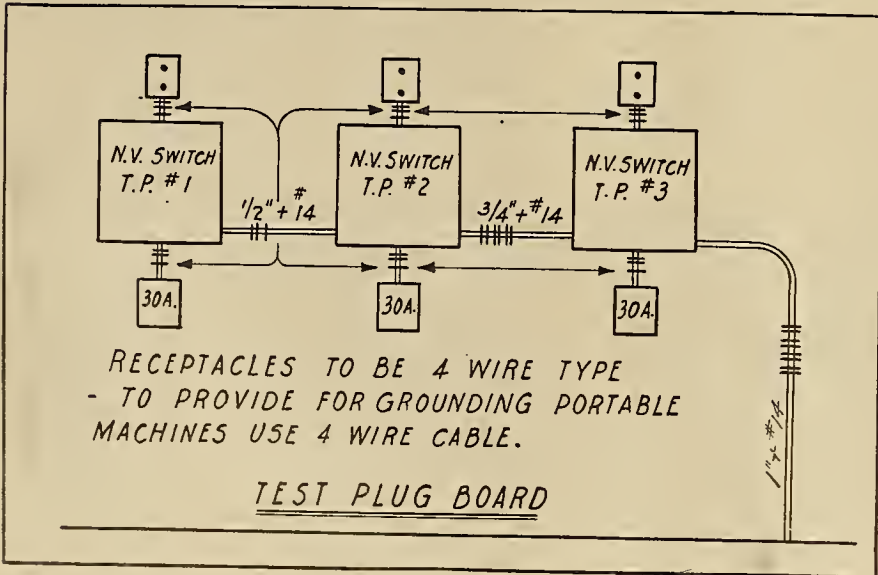


Fig. 4

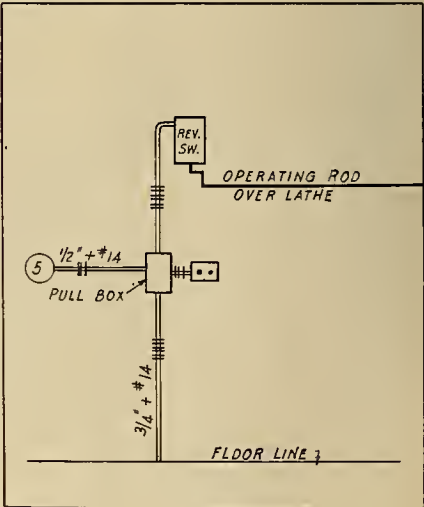


Fig. 6

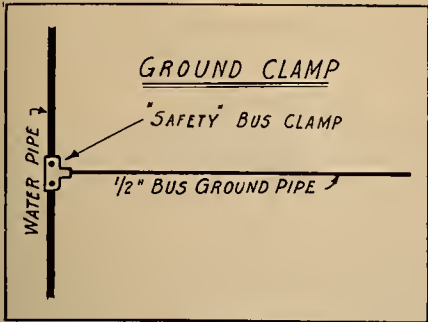
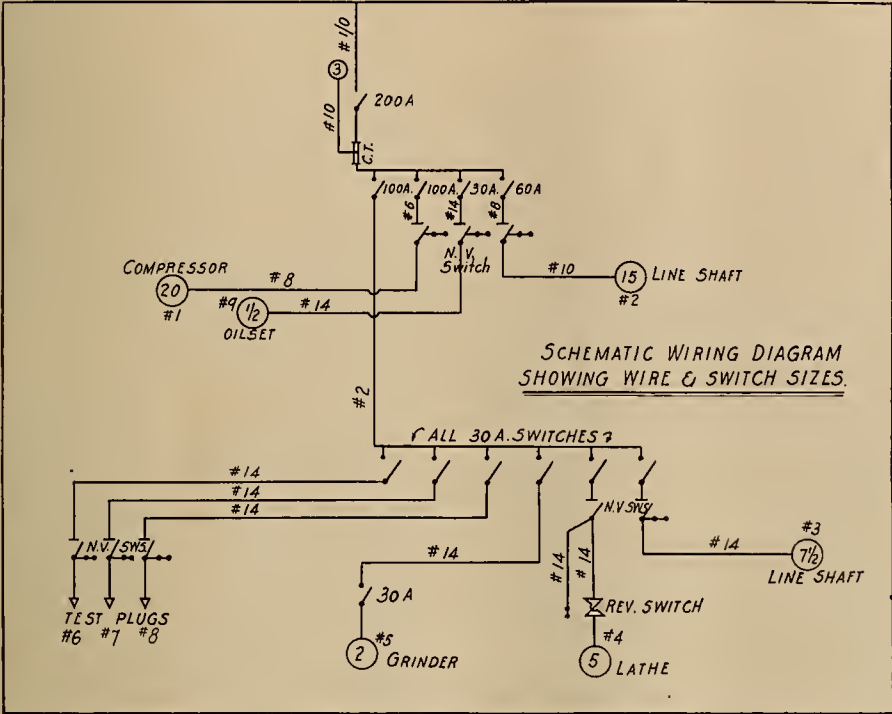


Fig. 5



BETTER MERCHANDISING

"Certificate" Assists Vacuum Cleaner Campaign Offering Housewives Free Rug Cleaning Results in Large Sales of Cleaners and Attachments

By the application of an unique sales stunt coupled with the usual advertising and sales effort, the Pacific Power & Light Company, Portland, set a new high mark in its annual spring vacuum cleaner campaign carried on in April under the direction of V. H. Moon, appliance sales superintendent. In the 30-day period 404 cleaners and 165 sets of attachments were sold as against 256 cleaners last year, or an increase of nearly fifty-eight per cent over the most successful campaign up to that time.

The punch in the campaign centered around the so-called "Certificate of Cleaning". The card used for this is reproduced on this page, and, as may be seen, offered an opportunity to the householder to have a rug cleaned, and also entitled him to a chance on one of the seven cleaners given away in a drawing at the end of the campaign. The cards were slotted so that they could be hung over the knob of the front door. Distribution of the cards was made prior to the commencement of the campaign by boys hired for the purpose in each town served, and by mail in the rural districts. Practically 30,000 cards were distributed by these methods, reaching virtually all the residential customers of the company in its several districts.

All the customers had to do was telephone for an appointment to have a rug cleaned. A company representative then called at the appointed time,

and in the course of cleaning the rug was able to put across a complete demonstration of the Premier Duplex cleaner, which was the one chosen for the campaign. On completion of the demonstration the "Certificate of Cleaning" was filled out with the name and address of the householder, initiated by the company representative, and detached for entry in the drawing, the householder retaining the other half of the card carrying the duplicate number. At the end of the campaign the returned certificates were segregated into seven groups of nearly equal numbers, representing seven general territorial divisions. A winner was then drawn by lot from each group, and by this method of seeding, the seven free cleaners were scattered over a wide territory and seven different towns were represented in the fruits of the drawing. In the case of a winner having been a purchaser during the campaign, the down payment was refunded and the balance of the purchase price was credited.

Counsel had advised that this was not a lottery inasmuch as the contestants had not paid anything with the expectation of receiving anything. Notwithstanding this interpretation of the lottery law, one postmaster refused to pass the cards through the mail and also refused to accept for mailing any newspaper carrying a company advertisement containing a reference to this drawing. It was a matter of small moment to delete such reference from

the advertising copy for the newspapers of this town and to omit the rural districts served by this post office.

The benefits of such a plan will be obvious to the merchandiser. By means of it a list of the "livest" prospects in each community was secured, and the waste effort incident to a house-to-house canvass was eliminated. At the time the company representative called to do the cleaning as per agreement, he attempted to close a sale by means of his demonstration. Failing in this, he took his information about the prospect back to the office where the proper notations were made, and, of course, followed up the more live of these prospects later in the campaign.

Some humorous situations were encountered, several householders utilizing the opportunity to obtain gratis a little assistance with the spring house-cleaning. But even in such instances the salesman was instructed to follow out to the letter the company's part of the agreement to clean a rug and turn in a card for the drawing. That the plan was successful is evidenced by the fact that over 2,000 requests for a rug-cleaning were received. To have sold twenty per cent of these prospects was considered a good showing. In addition, an excellent list of prospects, represented by the best prospects not sold during the campaign, was secured and filed away for future use.

Other advertising media used included printing on the backs of envelopes carrying the monthly bills, car banners, bill boards and local newspapers. In this advertising among other things the offer of "\$10 for your old cleaner" was featured. This applied to any old cleaner in whatever state of repair and disrepair.

A feature of the newspaper advertising was the tie-in with the Saturday Evening Post advertising on the Premier cleaner, a double-page spread in color appearing about the middle of the campaign. Reprints of this were posted in the company's store windows, and attention was directed to it in the advertising copy in the local newspapers.

To stimulate activity among the employees outside of the merchandising department, quotas were allotted to the districts and prize money offered for the highest percentages of quota reached. The so-called President's Cup, a trophy of some years' standing, offered for excellence in merchandise sales, was a feature of the competition and was won by the Yakima, Wash., district, which sold 95 cleaners and 66 sets of attachments, making 250 per cent of its quota.

At pre-campaign meetings bringing together in the several districts the sales forces and others interested in merchandising, a series of lessons in the proper method of demonstrating the cleaner was given by Charles Pearl, Pacific States Electric Company, Portland.

This offer expires
on April 30

Six Premier Duplex vacuum
cleaners will be given home-
owners served by this company.
Here is your opportunity to try
for one.

How to get a rug cleaned — and possibly a vacuum cleaner, FREE!

1. Telephone us if you wish a rug cleaned — and when. You will be under no obligation. Do this right away. — First come, first served.
2. When your rug is cleaned fill out the "Certificate of Cleaning" and have our representative initial it. Then detach it for him to bring back to our office.
3. Early in May names of the winners will be drawn. Your number may get one of the six Premier Duplex Cleaners!
4. Important: — Only completely filled out and initialed "Certificates of Cleaning" will be drawn. Only one Certificate to a customer.

Note: Save this part of the Card for No. 15009
(A "Certificate of Cleaning" may bring you one of six Premier Duplex Cleaners FREE! Give us the opportunity to fulfill the conditions.)

PACIFIC POWER & LIGHT COMPANY

Certificate of Cleaning	
(This Certificate when signed by you and initialed by our representative, from now on entitles you to a free rug cleaning and a chance to win one of six Premier Duplex Cleaners FREE!)	
This is to certify that your representative has today cleaned a rug in my home thereby entitling me to an opportunity to win one of six Premier Duplex Cleaners FREE!	Date _____
No. 15009 Name _____	Address _____
Signed P. P. & L. Co.	By _____

This card brings
you a free cleaning
of a rug and an
opportunity for
a vacuum
cleaner FREE!

HOW? you ask — read the other side

A clean bill of health offered by the Pacific Power & Light Company of Portland in its record-breaking spring vacuum cleaning sale recently. These tags, offering housewives a free rug cleaning, were slipped over door knobs. Both sides of the card are reproduced here

Boys Aid in Unique Lamp Selling Campaign

E. Roy Nash, Salinas and Monterey Electrical Dealer Sells
1,046 Lamps in Twenty-four Day Contest

Quiet months hold no terrors for the ingenious. They merely present a challenge. At least to E. Roy Nash and his organization, of Salinas and Monterey, Calif., the so-called quiet months of the summer held out only opportunity for a unique sales plan by which he disposed of 1,046 lamps in a twenty-four-day period, adding 80,275 watts to the lines of the power company, besides making scores of housewives his friends.

The essentials of Roy Nash's plan were simple. Take a bunch of boys during summer vacation, anxious to earn spending money, set up a radio set as a prize, teach them something about lighting and lamps, give them market baskets loaded with all kinds of lamps and turn them loose in a wide-awake town—there you have it.

Although, in essence, such was the plan, the details themselves are interesting. They show considerable originality, a keen sense of the possibilities for lighting sales, and a smoothly working organization.

About two weeks before the date selected for the opening of the contest some rather large advertisements addressed to the boys of the city, were run in the local papers. In them, boys were told that the E. Roy Nash Company was going to give a \$120 radio set away to some boy who made the highest score in a contest, the details of which boys might learn by calling at the store.

About twenty applicants responded, and from that group ten were selected to come back three nights a week to receive some well thought out information in respect to the basic principles of better home lighting. In the classes subsequently held the boys were given a pretty thorough course of instruction, and, too, they were given books to read on better lighting. An examination at the end of the course eliminated some of the less ambitious, and the crew finally was reduced to four, the number thought right to conduct the campaign with.

The town then was blocked out in districts, each boy being assigned a district containing practically equal opportunity. Each boy was to work his district in a careful and intelligent manner. The store, of course, gave them all the help it could, even going so far as to make the first few calls with the boys to get them started right.

Each boy was given a market basket filled with lamps of various wattages. Meanwhile advertisements were running in the papers continuously, preparing the public for the visits from the boy salesmen of the contest. People were told further that now was a good time to check up on the supply of lamps in their homes, that the boys would bring lamps to them and thus save them the inconvenience of a trip to the store to buy. Emphasis was placed on the "kitchen specials", which were the 75, 100 and 150-watt.

Although one of the boys quit before the week was over, the campaign went on with the three remaining boys. When the contest had closed the following results were tabulated:

The contest ran for 24 days.

Three boys were employed, whose ages were 11, 12, and 14, respectively.

1,046 lamps had been sold.

The wattage aggregate had been increased 80,275 watts.

Sales amounted to \$490.08.

There had been sold 158 75-watt lamps replacing 50-watt lamps; 124 100-watt lamps replacing 50-watt lamps; 47 150-watt lamps replacing 50-watt lamps; and 30 200-watt lamps replacing 50-watt lamps.

The foregoing figures are for lamps sold by the boys only, but the E. Roy Nash Company also was gratified to find at the end of the month that its lamp business was over 300 per cent of the average monthly business—in a comparatively quiet month, too.

Advertising expense was figured at 5½ per cent of the sales, and commissions amounted to 5½ per cent of sales. They did 96 per cent cash, and 4 per cent credit business in the sale. The commission schedule, to compensate the boys for their efforts, regardless of whether they won the prize or not, was as follows:

For every lamp of from 10 to 50 watts, 2 cents; from 50 to 60, 3 cents; from 60 to 75, 5 cents; from 75 to 100, 7 cents; from 100 to 150, 8 cents; from 150 to 200, 10 cents.

To the boy getting the highest score in points of credit was given a radio set which sold for \$120. The boy getting the next highest number was given a kit of radio parts selling for \$40. Points of credit were worked out on a similar basis to the plan for commissions, except that the points were reckoned not only on actual sales but on replacement of low wattage for higher wattage and other considerations. Details of the credit and commission schedules and other parts of the plan will be furnished other dealers by the Nash organization upon request.

Certainly the entire plan commends itself to the imagination of any dealer of lamps, and also offers possibilities of development for other lines of merchandise.

Sixth Electric Range Sale Breaks All Former Records

The sixth electric range sale in a three-year period surpassed all previous campaigns in the experience of The Washington Water Power Company, which closed the last campaign recently.

The total quota set for the system was 360 ranges, and the total sold was 469, or 30 per cent greater than was anticipated.

For the latest campaign the Westinghouse junior cabinet range, with automatic control, was selected as the especial feature, and in the advertising program a radical departure was made from previous practice. The items making up the total price installed were plainly stated in the advertising, as follows:

Junior Cabinet Westinghouse electric range.....	\$129
Wiring for range and water heater.....	40
Electric water heater.....	10
Fiberform cover for hot water tank.....	10

Total price.....\$189

\$4.00 Down—The balance in small payments with your monthly light bills.

With this form of plain advertising a customer who was familiar with present prices could see at a glance that the cost of a first class electric range was somewhat less than that of a coal, wood, or gas range of equal quality and capability.

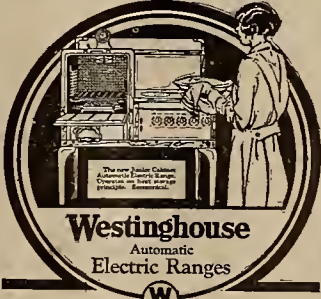
Quotas for Spokane and the other towns on the system were set carefully, after analysis of previous campaigns. In making up the quota for the country towns it was decided to use as a basis two ranges for each employee, and thus a total quota of 198 ranges was determined. This figure was considerably higher than previous records justified.

The advertising in Spokane and country towns consisted of ample space in the newspapers, broadsides mailed to prospective customers, and small attractive folders. In Spokane two illuminated billboards located on principal car lines were used.

At the close of the campaign it was noted that in Spokane one residential customer out of every six is a range user, and in the country one out of every three. For the whole system, one customer out of five is a range user.

Making Spokane a City of Electric Ranges Now Selling More Ranges Than Ever Before

\$4.00
D
O
W
N
\$4.00



Westinghouse
Automatic
Electric Ranges

"The Range" with the Check"

Junior Cabinet Westinghouse

\$189

Special Down Payment \$4

More than six thousand electric ranges were in use on our system when this sale began. Allowing five to the family, over 30,000 men, women and children were being served with nutritious, healthful food—cooked electrically.

Then along came the New Junior Cabinet Westinghouse Automatic electric range, presented in a great introductory sale. As a result we are selling more electric ranges right now than ever before. Our quota has been passed—ranges are selling faster than we can install them.

This sale brings to you the opportunity to have a complete electric kitchen for \$189.00—your down payment only \$4.00 and the balance in small monthly payments with your light bills.

An Electric Range at the Same Price as a Good Fuel Range

In this sale we present you with a complete electric kitchen, including electric water heater—ready to use—\$420.00.

Here is the classification of all the items that go into a complete electric kitchen showing you the price of each separately:

Junior Cabinet Westinghouse Electric Range.....	\$129.00
Water and Water Heater Price.....	40.00
Electric Water Heater.....	10.00
Fiberform Cover for Hot Water Tank.....	10.00
Total price for a complete electric kitchen.....	\$189.00

The Washington Water Power Co.

Corner Trent and Lincoln
Telephone Main 5171

COOK BY WIRE INSTEAD OF FIRE

Sale in Progress in All Our
Inland Empire Branches

Type of advertisements run by The Washington Water Power Company in its recent successful range sale, in which the records of previous sales were surpassed. The fact that an electric range could be obtained as cheaply as any other fuel range was made a feature of the sale.

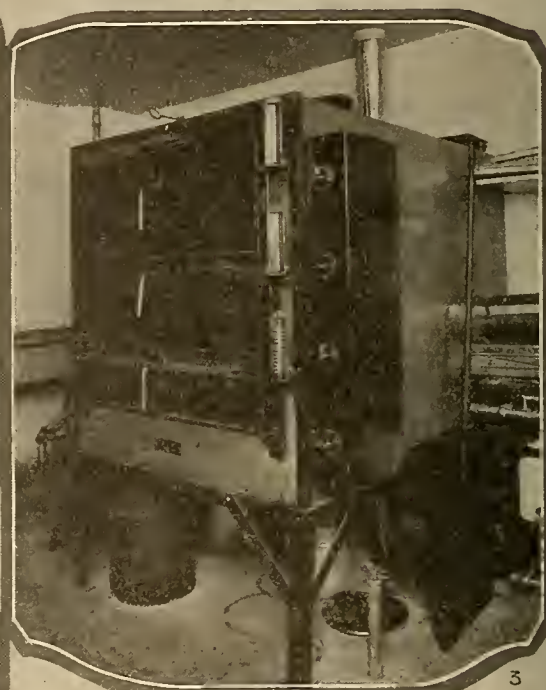


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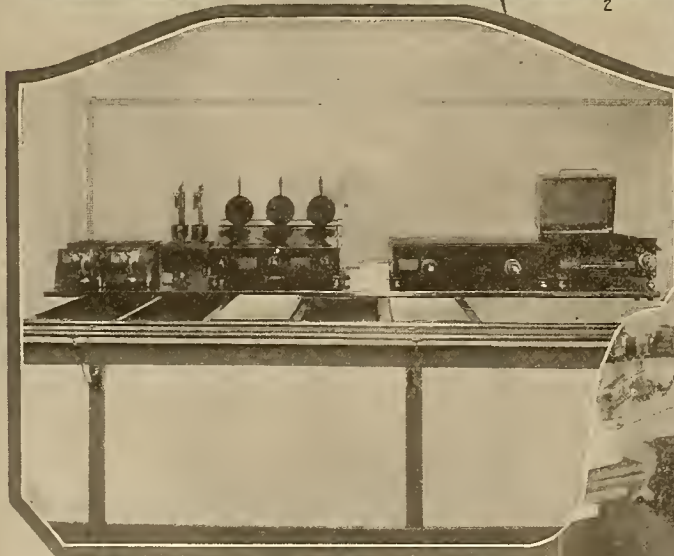
SALT LAKE CITY'S electrical cafeteria is claimed to have the largest cooking load in the West, and also to be the most economical. 1. The fountain, a feature of the place, has many electrical helps. 2. Electric coffee and cocoa urns serve quickly and consistently well. 3. The electric oven, in which the cafeteria's bread, pastries, and baked dishes are prepared. 4. Grilled steaks, toast, eggs and hot cakes are prepared electrically here. 5. One of the heavy-duty electric ranges in a corner of the well equipped kitchen. This installation includes electric refrigeration, and many motor-driven units in the kitchen. In the dining room particular attention has been paid to ventilation and lighting.



2



3



4



5

Electrical Cafeteria at Salt Lake Proves Economy

Besides Cooking, Baking, Refrigeration and Ventilation,
Electricity Performs Many Other Tasks

One of the most interesting examples of complete electrification in the restaurant business is that of Shay's Cafeteria, which now is operating in its new location in the Thompson Building in Salt Lake City.

Shay's Cafeteria is described as a stolen bit of old Egypt set down in Salt Lake and modernized to the highest degree. In designing the new cafeteria a great deal of attention was given to the harmonizing of every detail to produce the maximum comfort and efficiency with the minimum space and effort.

In this cafeteria electricity has been utilized for practically every purpose where it is feasible. At the front entrance the customer is greeted by a large electric sign in the form of a flaming arrow, reading "Cafeteria." At the fountain toasted sandwiches are made in an automatic electric sandwich toaster. Coffee is served piping hot from a battery of six electric percolators, and steam table foods are kept hot in an electrically heated steam table. Soiled dishes are carried on an electric

elevator to the basement where they are cleaned in electrically operated steam dish-washers.

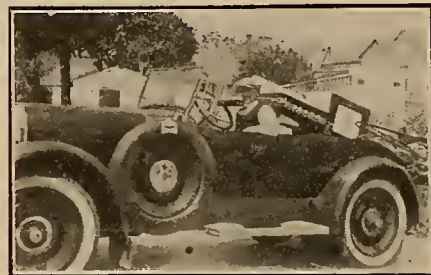
Passing through the foyer the customer enters the main dining room, which has a seating capacity of 400. This room is arranged with a main dining salon and a mezzanine, with two small dining rooms at the rear of the upper floor for private parties. The lighting effects are produced from a large roof window which floods the center of the dining room with sunlight. The lights are of opal glassware suspended from fixtures or placed against the ceiling. The glassware is etched with a tan design.

At the rear of the dining hall and separated from it by a plaster partition, are the double serving counters. These are finished in nickel and white enamel with white glass tops.

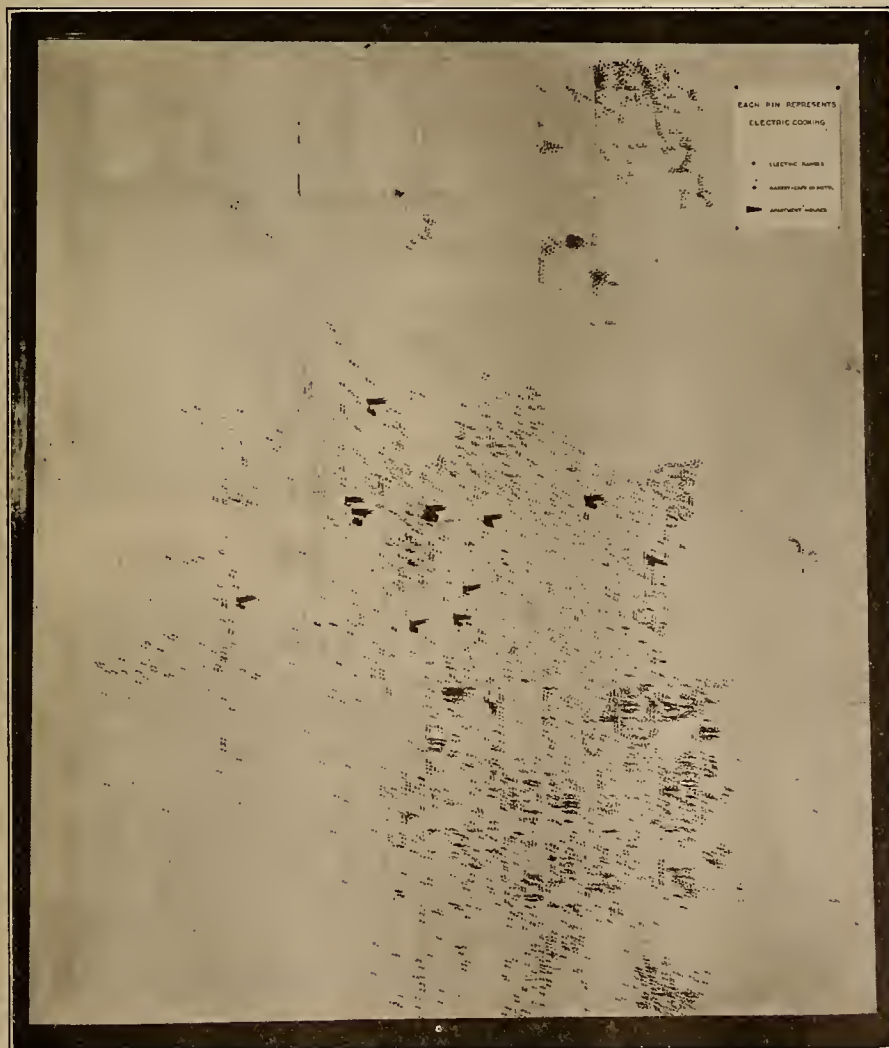
Just at the entrance to the serving counters is the short order department, where orders are filled for toast, eggs, waffles, hot cakes, broiled meats, or any of the similar foods. All these orders are cooked on electrically operated and

electrically heated devices. At the end of the serving counters coffee or chocolate is served from three electrically heated urns.

In the kitchen the real heavy-duty cooking equipment is installed. This includes one Edison 120-loaf oven, which operates all day to supply the demand for pastries; one 60-loaf roasting oven installed in the range section to handle the roast meats, macaroni, or any of the baked dishes, and a battery of three



Bringing the mountain to Mahomet, as it were, was J. C. Douglas, range specialist for the Edison Electric Appliance Company, in the central and northern California territory. When the new RA73 sample arrived, Mr. Douglas loaded it into the rear of his car and took it with him to hold demonstrations at the offices of dealers and power companies. He was anxious to show it to the largest number in the shortest time, and his novel stunt is said to have attracted considerable interest, incidentally landing orders for many ranges.



A novel method has been adopted by the Utah Power & Light Company to present a bird's-eye view of electric cooking in Salt Lake City. A large map of the city, in which is inserted a black-headed pin for each electric range installation, is displayed in the company's store and attracts considerable attention, enabling the observer to visualize at a glance the very favorable situation in that city in regard to the use of electricity in cooking. Approximately 4,500 electric ranges are in use there, and all are shown on the map

Edison hotel-type ranges 12 ft. long. All the range work of the cafeteria is done on these ranges. Steam vegetable cookers take care of the boiling operations in the kitchen, while a steam pressure cooker handles the steam parboiling and other work of this class.

In the basement is located the refrigeration plant, which supplies the ice boxes, the iced counters, the fountain and the cooling chambers with the necessary low temperature. This plant is operated by an electric motor. Other motor-driven devices are ice cream freezer, potato peelers, dish washers, glass washers, and tray sub-veyors which carry the soiled dishes from both floors of the dining room to the basement where they are washed and sterilized in live steam.

An electrically driven ventilation system, which forces washed air into the dining room through vents, also draws the air out through other ducts, making a complete change of air possible every five minutes. This method eliminates the objectionable odors so common in public dining rooms.

The total connected electrical load in this cafeteria is 125 kw. of cooking equipment, 50 hp. of motive power and approximately 18 kw. of lighting. Since the opening of the establishment there have been about 54,000 meals per month served, and 17,000 kw-hr. required to cook them, or .315 kw-hr. per meal.

This is claimed to be the largest electrical cooking load for general restaurant work in the western part of the United States. This cafeteria also is said to be the most completely equipped to perform with electricity the various tasks formerly done by other fuels and motive power. Records show that in actual operation it is one of the most economical and efficient installations in the United States.

NEWS OF THE INDUSTRY

Oregon Committee on Relation of Electricity to Agriculture Issues First Report

"When the lines are built the solution of the problem of electric service on the farm has only been begun." This is one of the introductory statements in a report on the status of the rural electrification problem in Oregon issued recently by the Oregon Committee on the Relation of Electricity to Agriculture through the medium of a booklet entitled, "Electricity in Oregon Agriculture." This is the first report of this committee formed last year with James T. Jardine, director of the experiment station, Oregon Agricultural College, Corvallis, Ore., as chairman, to conduct the initial survey of the problem (*Journal of Electricity*, Sept. 15, 1924, p. 221). The data secured in this survey are not included in the booklet, but the statements and conclusions in the booklet are based on the data collected.

In the introduction presenting the general problem, the report estimates that approximately 7,500 Oregon farms, of 15 per cent, have electric service, of one kind or another, two-thirds having central station service and one-third having private plants. The magnitude of the task of electrifying all the farms is expressed as follows:

"Assuming an average of 2.5 farms per mile, it will require 20,000 miles of distribution lines to reach the farms of Oregon. At an average cost of only \$1,000 per mile, this represents an investment of \$20,000,000.

"In order to use electricity properly on the farm two dollars will be required for wiring and equipment for every dollar spent in rural distribution systems. This makes an additional investment of \$40,000,000, a total greater than the present value of mechanical equipment in Oregon farms."

The question then is asked, "Can a reasonable return be made on this investment?"

Several specific problems that have presented themselves to the committee for solution next are listed. These include questions as to whether increased yields of various crops secured through irrigating by electric pumping will pay a return over and above the cost of such irrigating; questions involving the determination of the best type of equipment to use for irrigation and other purposes; and questions pertaining to the use of electricity in grinding feed, in poultry and egg production, in dairying, and for warming drinking water for stock in winter.

The need for cooperation of the commercial and industrial interests involved is stressed, and a short history of the formation of the Oregon committee in cooperation with the national committee is given. The aims and scope of the

work of this committee are expressed in part as follows: "That the first step in the investigation should be a state survey to determine the present status of rural electric service. That this survey would furnish the basis for the development of an investigation program which would extend over a period of at least five years."

Summarizing the results of the field survey conducted under the auspices of the committee in the summer of 1924 by Prof. W. J. Gilmore and Prof. F. O. McMillan of the Oregon Agricultural College, the report states that 188 farms were investigated. The data collected revealed, among others, the following facts:

"That there were an average of 4.17 users per mile of distribution line.

"That 26 per cent of the farmers on these lines were not using current primarily because of lack of ability to finance the undertaking.

"That the most extensive use of electricity on farms was for lighting and household conveniences, since 44 per cent of the electrical consumption by farmers was for household uses.

"That the more extended use of electric service does not depend so much upon the price of current as upon the farmer's ability to finance the purchase of equipment.

"That in the last analysis the price of current per kw-hr. will depend largely upon the volume of use. * * *

"That a more extended use of electricity will improve living conditions as indicated by answers from farmers. This can be obtained in most cases, however, only by increased living costs, unless electricity can be made to pay its way by lessening production costs of farm products."

In discussing the future plans of the committee, the report reaches these significant conclusions:

"After thoroughly reviewing the data gathered, the members of the committee agreed that today the art of generating and distributing electric current is well in advance of the art of using it on the farm. It is not a case of more power stations, but of finding out whether or not an electric load of sufficient size can be built on the farm so that the farmer can afford to carry the necessary expense involved in furnishing service. * * *

"After everything possible has been done, therefore, towards reducing generation and distribution costs, it is evident that the fair price of electricity is going to depend upon how large a load the farmer can profitably use."

With the view to determining to what extent this load can be built up, the re-

port then recommends a further investigation of some of the questions raised in the statement of the specific problems made earlier in the booklet, and concludes by stating that the electric light and power industry had provided funds for a continuance of the work this year to carry out the suggested investigations.

Murphy Returns from Lamp Men's Annual Convention

Returning from a month's trip over the northern and Pacific Coast territory, enroute to and from the annual meeting of district managers of the Westinghouse Lamp Company at Garden City, Long Island, N. Y., Ray W. Murphy, Pacific Coast manager for the lamp company, has returned to his accustomed activities at the main office in San Francisco.

Mr. Murphy brought to the district manager's annual meeting of the West-



RAY W. MURPHY

inghouse Lamp Company the Pacific Coast territory's experiences and activities. The meeting was held for the purpose of discussing the lamp sales program for the year, and for demonstrating new features of the lamps to be brought out by the company during the next year. The Pacific Coast region is considered one of the most important units in the company's field, having branch offices at Seattle, Los Angeles and Salt Lake, and men stationed at Spokane, Portland and El Paso.

On his trip East Mr. Murphy conferred with his branch managers at Portland, Seattle and Spokane, and also stopped at Butte, Mont. On his return he stopped at the Salt Lake City office.

While at the district manager's conference in Long Island, Mr. Murphy's well known proficiency at golf stood him in good stead in competition with Eastern managers, for it was reported that he annexed honors in his favorite game for the Pacific Coast division, by way of completely rounding out his trip.

Great Western Starts 220-kv. Line to Connect with San Joaquin System Near Merced

For over a hundred miles, as straight as the schoolbook geometry definition of "the shortest distance between two points," the new 220-kv. line of the Great Western Power Company of California to connect with the lines of the San Joaquin Light & Power Corporation, will be hurried to early completion. With the authorization of the line from the State Railroad Commission, Sept. 14, work began in earnest on the project. So well organized for the start was the Great Western organization that three crews immediately took the field and before the week was finished were well under way.

The new line of the Great Western Power Company is to run from its Brighton substation, six miles east of Sacramento, in a straight line to a point a short distance east of Merced, where it will make its only bend and terminate at a substation, also to be constructed, a mile and a half southeast of Merced. The substation there is to be of the outdoor type, to step down the voltage to prevailing voltages on the San Joaquin system. It will contain condenser equipment also.

Steel towers, spaced 230 ft. apart, will carry the line its length of 102¾ miles. The line is to be of twin-circuit construction, although only one circuit

will be strung at the present time. While every piece of equipment is to be provided for 220-kv. operation, the line is to be operated at 165-kv. at present until other contemplated construction has progressed to a point at which operation at the higher voltage may be undertaken.

Conductors are to be aluminum cable, 1.093 in. in diameter, with a conductivity rated at the equivalent of 500,000 copper. The conductors will be spaced 16 ft. on the vertical plane, and there will be 27-ft., 4-in. spacing between circuits. Pacific Coast Steel Company towers will be used.

The substation is to contain a bank of 50,000-kva. transformers and necessary switch gear and equipment. The condenser is to be of 250,000-kva. capacity.

By fortunate circumstances, railroad lines interweave the path of the new line, making transportation of equipment quite facile. Three crews are in the field at present, digging for the footings of the towers and moving the equipment on the field as well as clearing the right-of-way. Interesting use of motor equipment is planned for the job, details of which are promised later.

Subcommittee Chairmen of Three Northwest Assn. Sections

The appointment of chairmen of subcommittees in three of the sections of the Northwest Electric Light & Power Association has been announced, and these chairmen rapidly are completing their organizations by the appointment of committee members.

Z. E. Merrill, assistant general manager, Mountain States Power Company, Albany, Ore., chairman of the Technical Section, announces the following chairmen of subcommittees in his section: Accident Prevention Committee—J. B. Fiskien, The Washington Water Power Company, Spokane; Committee on Cooperation with Regulatory Bodies—H. J. Flagg, Gray's Harbor Railway & Light Company, Aberdeen, Wash.; Electrical Apparatus Committee—D. W. Proebstel, Portland Electric Power Company, Portland; Hydraulic Power Committee—O. L. LeFever, Northwestern Electric Company, Portland; Inductive Co-ordination Committee—G. E. Quinan, Puget Sound Power & Light Company, Seattle; Meters Committee—R. E. Thatcher, Puget Sound Power & Light Company, Seattle; Overhead Systems Committee—J. B. Brokaw, Eastern Oregon Light & Power Company, Baker, Ore.; Prime Movers Committee—C. C. Simeral, Portland Electric Power Company, Portland; and Underground Systems Committee—E. F. Pearson, Northwestern Electric Company, Portland. The executive committee of the Technical Section is composed of the above ten men and in addition, R. R. Robley, Portland Electric Power Company, Portland, F. J. Rankin, Idaho Power Company, Boise, Idaho, and H. H. Schoolfield, Pacific Power & Light Company, Portland.

W. H. Ude, director of public relations, The Washington Water Power

Company, Spokane, chairman of the Public Relations Section, announces the following appointments to subcommittee chairmanships in his section: Customer Ownership Committee—Dwight Ware, sales manager, Puget Sound Power & Light Securities Company, Seattle; Industrial Relations Committee—Colonel H. G. Winsor, personnel officer, Puget Sound Power & Light Company; Public Speaking Committee—J. B. Fiskien, consulting engineer, The Washington Water Power Company, Spokane; Committee on Cooperation with Educational Institutions—A. J. Priest, attorney, Idaho Power Company, Boise; and Women's Committee—Mrs. L. A. McArthur, Pacific Power & Light Company, Portland.

In the Accounting Section, A. J. Johnstone, auditor, Portland Electric Power Company, Portland, chairman, has appointed the following subcommittee chairmen: Classification of Accounts Committee—M. J. Wilkinson, assistant secretary and assistant treasurer, Pacific Power & Light Company, Portland; Fixed Capital Committee—J. A. Rockwood, valuation engineer, Portland Electric Power Company, Portland; Purchasing and Stores Committee—F. W. Brownell, comptroller, Puget Sound Power & Light Company, Seattle; Statistical Methods Committee—William Hawkes, cashier, Puget Sound Power & Light Company, Olympia, Wash.; and Revenue and Disbursement Committee—A. E. Janssen, treasurer, Idaho Power Company, Boise.

Denver League Name Changed.—Following discussion of the advisability of changing the name of the Electrical Cooperative League of Denver, the Advisory Board of that body recently decided in favor of the change, and chose the name, "The Electrical League of Colorado."

B. C. Electric Railway to Develop Bridge River Project

"We have decided to exercise an option on the Bridge River project, which we have held for a year and a half." Such was the announcement of George Kidd, president of the British Columbia Electric Railway Company, Vancouver, B. C., at the opening of the fifth and final unit of that company's Stave Lake plant. The opening was performed by the Hon. John Oliver, premier of British Columbia, on Sept. 19, before an assembly of 150 invited guests, representing leaders in business, civic and political life of the province. George Kidd, in making the announcement, said further:

"In that time we have made a thorough investigation of the possibilities of that development, and, while it will be a very costly one in the initial stages, we are confident that Vancouver and the lower mainland will justify the expenditure we intend to make."

As outlined by the engineers of the company, the B. C. Electric proposes to develop the plant in four stages. The first stage will develop 60,000 hp. at a cost of \$13,271,000. The second stage will develop 30,000 hp. at a total cost of \$14,700,000. The third stage will develop 150,000 hp. at a total cost of \$28,000,000, and the fourth stage will bring the total expenditure up to \$30,000,000, and will develop a total of 400,000 hp.

The capacity of the company's present equipment amounts to 164,900 hp. and 453,000,000 kw-hr. per year, without including the steam plant. The consumption during last year was 300,000,000 kw-hr. At a 10 per cent cumulative increase per annum the surplus supply will be exhausted by the end of 1929.

Edison Company Lets Contracts for Several Projects

Following closely the announcement of the letting of contracts for its Vincent line (Journal of Electricity, Sept. 15, p. 222), the Southern California Edison Company has announced further contracts for project work.

Contracts were let recently to C. E. Ingalls, California representative for the Electric Power Equipment Corporation, for the manufacture of forty-three 220-kv. three-pole, group-operated switches to be used at the Laguna Bell, La Crescenta, and Eagle Rock substations of the Southern California Edison Company in connection with the Vincent line.

The Westinghouse Electric & Manufacturing Company was awarded the contract to furnish twenty-one 220-kv. oil circuit breakers for use at these substations. The insulators for the entire line are to be manufactured by the Westinghouse High Voltage Insulator Company, whose plant is at Emeryville, Calif., and will be of the Westinghouse 632 high-strength, non-interchangeable type. On suspension towers single strings of insulators will be used; on canyon-crossing and dead-end towers double-yoke strings are specified. The contract calls for 50,000 insulators.

Announcement also was made of the awarding of contract to the General Electric Company for a 52,000-kw. turbo-generator for an additional unit to the Long Beach steam plant of the Southern California Edison Company.

Lively Meeting Launches Industrial Lighting Activity in Northern District

Nothing if not lively was the first meeting to discuss the N.E.L.A. Industrial Lighting Campaign held in the Pacific Gas and Electric Building, San Francisco, Sept. 21. Similar meetings are to be called in other districts, and because the plan of action is to be similar, an outline of the northern and central California district meeting will prove of interest.

A. M. Frost, sales manager, San Joaquin Light & Power Corporation, geographic chairman of the Industrial Lighting Activity for the Pacific Coast division, opened the meeting without formality. In fact, he definitely stated that he wanted to eliminate all "smoke screens" of superfluous organization and reduce the campaign to the utmost simplicity. Outlining the plan as a purely commercial one to "increase sales and profits," he described it as a unified sales plan wherein the various branches of the industry interested might profit from a concerted action rather than struggle under the handicap of individual effort.

H. H. Allison, Great Western Power Company, and C. E. Monteith, Pacific Gas and Electric Company, San Francisco, were named as vice-chairmen in charge of the activity in the northern and central California sector. Mr. Allison outlined the plan of action as simplified by Mr. Frost to be as follows:

Surveys of each city and town are to be made by the power sales representatives of the power companies, it being considered that they have a better knowledge of actual conditions on their meters than any other organization. Every industry and commercial enterprise, from the ordinary garage or tailor shop on up to the big industrial plant, is to be listed. Wherever there is need for better lighting, reflectors, glassware, or rewiring, these facts will be noted.

Each prospect listed is then to be interviewed by power company representatives and interested in better lighting. The prospect's contractor's name is to be learned, and then the prospect is to be turned over to that contractor. Where no preference is given as to contractor, the prospect is to be turned over to a contractor located near the prospect's place of business. Where there is competition, such prospects are to be drawn by lot. In case of disagreement as to a prospect the matter is to be referred to the contractor's association for decision.

Since it will be up to the contractor to sell the prospect on better lighting, special schools to train salesmen for industrial lighting sales are to be offered contractors and their employees. The educational activity of the campaign is to be headed by Clark Baker of the National Lamp Works, Oakland, Calif., who so successfully conducted the P.C.E.A. Better Lighting schools last year. He is to train fourteen men to present the industrial lighting sales message, these men to hold classes in each of the fourteen districts of the Pacific Coast division. The classes will be held at some convenient location, presumably in the evening, so that contractors, power company salesmen, and the salesmen of dealers, may attend.

Jobbers are to cooperate with contractors in the selling of better industrial lighting equipment. Many trained men will be put in the field by jobbing organizations and manufacturers to aid in putting the sales across. In cases where contractors fail to follow up prospects given them—and a follow-up system is designed to keep tab on the status of the campaign at all times—the jobbers may be asked to deal with the prospects direct.

The southern California territory was said to have started the activity already with the San Joaquin territory starting immediately. Mr. Frost intended to launch the activity in other sections of the Pacific Coast as soon as possible.

At the San Francisco meeting some valuable, as well as amusing, sidelights as to the position of the electrical consulting engineer in the development of more lighting and increased electric loads was presented in inimitable manner by Robert St. John, of Simonson & St. John, electrical engineering firm. He urged a complete combing of the field and promised rewards to the industry in proportion to the number of prospects called upon and the energy put into the campaign.

Ellensburg, Wash., City Council Seeks Information on Municipal Plant.—The city council of Ellensburg, Wash., has appointed an electric light committee and requested that body to obtain information on the employment of a technical expert, who will be asked to furnish the council with information as follows: value of the municipal light and power plant; what it will cost to put the plant in condition to function completely; whether it would pay to rehabilitate the plant in view of the cash offer for it made by the Puget Sound Power & Light Company; and an appraisal of the Ellensburg gas and water system. Figures compiled by the city council show that the gross receipts of the light department for the first five months of 1925 amounted to \$45,284.89. Deduction of operating expenses, interest, etc., left a net earning of \$15,127.11.

Municipal Plant Diesel Engine Unit Refused by Taxpayers

A temporary injunction has been issued through the courts restraining the city of Idaho Falls from purchasing a Diesel engine as an auxiliary unit to the municipal power plant. The injunction is the second step on the part of taxpayers in preventing the purchase, a bond of \$1,500 having been furnished by them a week previous.

The action was brought by a committee of taxpayers on the ground that the officials of the city of Idaho Falls are placing the city in debt to an unnecessary extent by making the purchase; that the city has no adequate place for housing the engine, and that it would be necessary to spend about \$15,000 in constructing a suitable engine house and paying for the installation of the auxiliary in addition to the initial cost, bringing the total up to approximately \$92,000.

Two Salt Lake City Blocks Have New Whiteway Lighting

Salt Lake City's newest whiteway lighting system, on First South Street, covering two blocks between State and West Temple Streets, was placed in operation on the night of Sept. 16, thousands of citizens taking part in the celebration arranged for the occasion. The switch that turned on the lights was thrown by Mayor C. Clarence Neslen at eight o'clock.

Dancing and the awarding of novelties and prizes were the events of the evening. The street was closed to traffic, and hundreds danced in the street to the music of bands. Merchants on the street held open house.

The new lighting system consists of 28 standards (seven to the block on each side of the street), each with three General Electric Company form 20-Y inverted luminous arc lamps. Each lamp is 1,500 cp., making a total of 4,500 cp. to each standard. The standards, which are 25 ft. in height from the ground to the top lamp, and 19 ft. to the lower lamps, are of Union Metal Manufacturing Company pressed steel with cast iron bracket base.

This installation completes the third unit in the attempt to make Salt Lake City's business district the best lighted in the world.



View of new whiteway lighting system on First South Street, between State and West Temple Streets, Salt Lake City. The photograph was taken at eleven o'clock at night

Electric League Conference at Camp V Declared Most Representative of All

The fourth conference of electrical leagues, known as Camp Cooperation V, held at Association Island, Henderson Harbor, N. Y., Sept. 8-12, sponsored by the Society for Electrical Development, passed into history as the most successful of all these meetings, not only from point of attendance but in spirit shown, constructiveness of program and entertainment. The attendance taxed the island's capacity and is to be recorded as the most representative of the series of annual conferences in that sixty-six were represented out of a total of 123 leagues.

The business program was designed to give a cross-section of league activities throughout the United States and Canada, to treat of league problems of organization and operation, and finally to consider the details of specific league activities. The discussions following the various papers evidenced a considerable advance over previous conferences. Reports, papers, and condensed discussions are to be made available to the leagues as quickly as they can be edited and reproduced.

An attractive arrangement displayed to advantage the exhibits of the following leagues: California, Cleveland, Detroit, Hudson Valley, Niagara Frontier, Northern Illinois, Pittsburgh, Rhode Island, Rochester, Syracuse, and Toronto. Much interest was shown in these exhibits and in that of the Society.

Mr. Goodwin portrayed the possibilities of the Red Seal Plan and then presented the Red Seal Manual which is being produced for distribution through licensed leagues to their members, the aim being to sell the members, especially the contractors, and to get them in turn to sell the Red Seal Plan at every opportunity.

Quite as a surprise, George W. Austen, manager of the Electric Service League, Toronto, was presented with an illuminated resolution of the board of directors of the Society for Electrical Development, "In recognition and appreciation of his contribution to the electrical industry in conceiving and initiating the idea of the Red Seal Plan to assure adequate wiring."

The woman's point of view found expression on Thursday evening when Miss Katherine Fisher, director of Good Housekeeping Institute, presented her subject, "What Women Want to Know About Electricity." Further thoughts were contributed by Miss Nichols of New York, Miss Rischman of Buffalo, Miss Bell of Minneapolis, and Miss Smith of Rochester, who reported nineteen women as members of the Rochester League.

The League Council met prior to making its report to the conference. The conference elected the Council for the coming year.

At a meeting following its election the new council elected J. E. North, president of the Electrical League of Cleveland, chairman, and Earl E. Whitehorn, vice-chairman. Members of the League Council for the Western territory are as follows: John J. Cooper, Denver, Colo.; Harry J. Martin, Seattle, Wash.; R. M. Bleak, Salt Lake City, Utah; C. T. Hutchinson, San Francisco, Calif.; K. E. Van Kuran, Los Angeles,

Calif., and James Lightbody, Vancouver, B. C.

Following each evening's business session the Island Volunteer Police Department took charge, staging a merry round of original entertainment with the talent recruited entirely from among the conferees. On Tuesday night "The Town Sociable" got everybody acquainted. On Wednesday and Thursday nights, respectively, "The Mock Trial" and "The Policemen's Ball" took place, in both of which all the entertainers performed impromptu. The social phase of the conference found its culmination in "Old Home Week in One Night," which was really the annual banquet in disguise.

Water Hammer Penstock Tests to Start Oct. 12

Oct. 12 has been set as the date for the beginning of the tests to determine the effect of water hammer on welded steel penstocks that are to be held at the plant of the A. O. Smith Corporation in Milwaukee, Wis. (Journal of Electricity, Aug. 15, 1925, p. 144.)

The test originally was planned for Sept. 28, but it was found necessary to postpone it to Oct. 12.

The test will be conducted for three days and will reproduce in severe form the action of water hammer. Gages operating with traveling tape will reproduce in graphic form the pressure action, and thus will be afforded the opportunity of studying this action. The whole mechanism is very pliable, and the number of impulses per minute as well as the pressure can be varied.

Committees from the American Society of Mechanical Engineers, the American Society of Civil Engineers, the American Society of Testing Materials, the American Institute of Electrical Engineers, and the American Institute of Mining and Metallurgical Engineers have been invited to attend the experiment. The test operation is to be turned over to the engineers present, and as extensive laboratory equipment will be provided it is believed an excellent opportunity will be afforded to study the effect of fatigue on the weld as well as on the original plate steel.

Seattle Company Seeks License for Chelan River Plant

Applications to develop power on many northwestern streams featured the Federal Power Commission activities recently. The most noteworthy of these was the application made to the commission by the Chelan Electric Company of Seattle, which applied for a license covering a project on Chelan River and Chelan Lake in Washington. It is proposed to construct a diversion and control dam in Chelan River, thereby giving Chelan Lake a reservoir capacity of 640,000 acre-ft. The project provides for two pipe lines 13 ft. in diameter and two miles long; five steel penstocks 10 ft. in diameter and 1,000 ft. long; a power house with five generator units. The primary power which thus will be made available is estimated at 65,000 hp. The secondary power will amount to 60,000 hp. The five turbines,

however, will be capable of developing an aggregate of 125,000 hp.

In this connection recent press dispatches quote an announcement attributed to D. L. Huntington, president of The Washington Water Power Company, Spokane, to the effect that that company has entered into an agreement with the Great Northern Railway Company relative to the future acquisition of the power site owned by the Chelan Electric Company, a subsidiary of the railroad company, and of ultimate development of Lake Chelan power. This action would cause the postponement of the Kettle Falls project, according to the announcement. No date has been set for the commencement of the work on the project.

Further Development Planned at Price's Lake, Wash.

Application for permission to appropriate 60 sec.ft. of water from Price's Lake, tributary to the Lilliwaup River in Mason County, Wash., for power purposes, was filed with R. K. Tiffany, state supervisor of hydraulics, Sept. 18, by the Lilliwaup Power & Water Company of Seattle. The application calls for development of 1,000 hp. at a 220-ft. head. Construction is to begin by Sept. 1, 1927, and is to be completed by Sept. 1, 1928. Contemplated construction includes a diversion dam, wood stave pipe line, a hydroelectric plant and appurtenant works. Estimated cost is \$75,000.

According to W. O. Stewart, secretary of the company, the purpose of this development is to utilize the drop between Price's Lake and the Lilliwaup River below the forks in conjunction with applications for a previous project recently filed by the same company (Journal of Electricity, Sept. 1, 1925, p. 184) in which it is intended to use the drop between the forks and Hood's Canal on the Lilliwaup River.

The Lilliwaup Land & Resort Company, which recently applied for permission to build a reservoir at Price's Lake (Journal of Electricity, Sept. 1, 1925, p. 184), on Sept. 17 filed two applications for water rights from the Lilliwaup River in the Hood's Canal country in Mason County and three reservoir applications in connection with a power project to cost approximately \$800,000. Construction will begin, if the necessary permits are granted, on or before Jan. 1, 1928, and will be finished by Jan. 1, 1929.

Furniture Dealers Receive Range Catalogs and Data on Electric Range Sales.—At a recent meeting of the furniture dealers of San Francisco held in the Pacific Gas and Electric Company Building at 447 Sutter Street, the sales program of the Pacific Gas and Electric Company and the Great Western Power Company was explained. A set of range catalogs in a folder was presented to all of the dealers present with the compliments of the two power companies. The folder contained catalogs of the following ranges: L & H, Universal, Crawford, Hotpoint, Westinghouse and Standard. Following the meeting, those present adjourned to the office of the Great Western Power Company where they inspected the two electric kitchens on display as well as the range display of that company.

Walla Walla Rate Hearing Raises Valuation Question

Questioning the usefulness and value of certain pieces of property of the Pacific Power & Light Company, witnesses for the cities of Walla Walla, Yakima, and other Washington communities joining in the formal complaint against the rates of the company consumed most of the six-day hearing before the Washington Department of Public Works held recently at Walla Walla. Other evidence submitted by the complainants attacked the company's power contract with The Washington Water Power Company, Spokane, and the company's method of setting up its depreciation account. The principal contention of the complainants was that certain pieces of property were no longer useful in the public service, were over-valued, and should not be included in the rate base valuation, and that this rate base was higher therefor than should actually obtain.

Evidence introduced by the defendant company tended to show that the properties alleged useless by the complainants were useful, and that the company was not earning an exorbitant return on the rate base established by the department as of Dec. 31, 1919, plus additions less retirements. No evidence as to valuation was offered by the company, it being held that the department's valuation of 1919 was valid until changed by a complete re-valuation of all the properties by physical inventory, which the company had offered to undertake some months ago. This offer was made again at the hearing.

The department presented the results of its own investigation carried on during the past year by the department engineers and accountants. The rates of the company were not discussed at this hearing, and at the close, John C. Denny, director, stated that the dates for the rate portion of the hearing would be announced later. The cities were represented by Hugh M. Caldwell, attorney, Seattle, while John A. Laing, vice-president and general attorney of the Pacific Power & Light Company, Portland, represented the company.

Seeks to Develop Power on the Cowlitz River.—Permission to build a reservoir on the Cowlitz River in Lewis County for storage of 10,000 acre-ft. of water for power purposes in connection with development of the Big Bend unit of an \$8,000,000 power project on the Cowlitz River (*Journal of Electricity*, Aug. 15, 1925, p. 147), is sought in an application filed with the state supervisor of hydraulics Sept. 18 by H. W. Crozier, of the Cowlitz Chehalis & Cascade Railway, Chehalis, Wash. Construction involved includes a concrete dam 45 ft. high, 150 ft. long on top and 75 ft. long on the bottom. The reservoir, which is to have an area of 1,000 acres when submerged, will cost approximately \$50,000.

Open House Held During Jubilee Celebration.—The Universal Electric Company, electrical supply jobbers of San Francisco, held an informal open house for their customers and friends on Wednesday, Sept. 9, during the Diamond Jubilee celebration. Sandwiches and coffee were served to those who attended.

Los Angeles Applies for Permit on Colorado Near Needles

The City of Los Angeles has applied to the Federal Power Commission for a preliminary permit covering a project on the Colorado River in San Bernardino County, Calif., and Yuma and Mohave Counties, Ariz. The project is in the vicinity of Parker, Ariz., and Needles, Calif. The plan provides for the storage of some 600,000 acre-ft. in a reservoir near Parker where a head of 90 ft. may be obtained. The amount of primary power which will be made available is estimated at 108,000 hp.

Two other applications are of interest. The Mt. Shasta Power Corporation, which holds the preliminary permit covering a project on the Pit River near Redding, Calif., has made application for license. The preliminary permit was issued May 5, 1923. The primary power that will be made available under the corporation's plan of development will be 56,880 hp. It is planned, however, to install three 40,000-hp. units. A part of the power will be marketed by the corporation itself. The balance is intended for the Pacific Gas and Electric Company.

The Red River Lumber Company of Minneapolis has applied for a preliminary permit on Hat Creek near the Lassen National Forest, near Cossel, Calif.

Labor Contract for Kings River Tunnel Calls for \$1,263,000

John de Luca, A. C. Dennis, and Floyd T. Huntington, were awarded the contract for the construction of the San Joaquin Light & Power Corporation's 19,400-ft. tunnel on its Kings River project, entailing a cost for labor alone of \$1,263,000, it was announced recently by Harold K. Fox, chief construction engineer for the corporation.

Work is to be rushed on a three-shift basis in order to complete the project late next year. Over 300 men are to be employed on the job. The tunnel is to be over three and one-half miles in length, 12 ft. in cross-section, and is designed to carry 720 sec.ft. of water from the north fork of the Kings River to the Balch power house. To permit the employment of five crews of men on the project simultaneously, two side shafts will be sunk into the mountain to a depth of 300 ft. each, joining the line of the main tunnel at such distances.

Work on the 228-ft. arch type dam which is to divert the water into the tunnel will begin at the same time, preliminary work already having been started there. Concrete on the dam will be poured early next summer, it is estimated.

Business Conditions Improving in Intermountain Region

For the first time in four years business conditions in the Intermountain region justify a highly optimistic attitude, according to Salt Lake City electrical jobbers. On the basis of present indications, fall electrical business will be larger in volume than for any period since 1920. Agricultural conditions in Utah, Idaho and Wyoming and the mining situation in Utah are responsible for the optimistic outlook.

Commenting upon the situation, C. B. Hawley, vice-president and general manager of the Intermountain Electric Company, says:

"The Salt Lake City jobbing territory holds great promise for a large volume of business for the first time in four years. Agricultural conditions in the territory were never more promising. Crops are large and prices are high. The farmers in Utah and Idaho will enjoy prosperity this fall in a measure un-



C. B. HAWLEY

equaled since the war. His prosperity will be reflected in increased activity in all lines of business. Our purchases are being made with the prospect of heavy fall and Christmas buying."

The same attitude is held by J. A. Kahn, president of the Capital Electric Company. Mr. Kahn says:

"With bumper crops and high prices and with mining conditions on the up grade, this section of the country will enjoy marked prosperity this year for



J. A. KAHN

the first time since 1920. This not only applies to the electrical industry but to all other lines of business. The situation as regards copper, silver, zinc and lead mining, as well as agricultural products and livestock, warrants a highly optimistic outlook. The general prosperity of the region will have its effect upon electrical business throughout this territory."

The same feeling of optimism pervades the entire electrical industry in the Intermountain region.

League Has Float in Diamond Jubilee Parade.—The San Francisco Electrical Development League had a very interesting float in the California Diamond Jubilee parade which was held Wednesday, Sept. 9. The float portrayed the generation of electrical energy, beginning with the snow-capped mountain and stream flowing from its side to the power house near the base. The float was towed by an electric truck which carried the emblem of the League.

Buck's Creek Plant to Become Property of Great Western

Authority has been granted by the California Railroad Commission to the Feather River Power Company, San Francisco, to issue and sell at not less than 90 per cent of face value, plus accrued interest, \$5,500,000 of first mortgage six per cent serial gold bonds, and \$2,100,000 of its capital stock. The proceeds derived from such sale will be used to finance the construction of the company's Buck's Creek hydroelectric power project on the North Fork of the Feather River in Plumas County, Calif. (Journal of Electricity, May 1, 1925, p. 334.)

The Feather River Power Company also is authorized by the commission to enter into an agreement with the Great Western Power Company of California, whereby it will sell the Buck's Creek power plant and appurtenances to that company under a contract covering a period of thirty-five years. During this period the power produced at the plant is to be sold to the Great Western Power Company at the rate of four mills per kw-hr. At the end of that time the plant, which will have an installed capacity of 60,000 hp., will become the property of the Great Western company.

The property and water rights owned by the Feather River company on the Middle Fork of the Feather River have been sold to the Western States Gas & Electric Company, Stockton, Calif., a Byllesby holding. It is reported that that company will start construction on the Bean Creek plant of the proposed development next spring.

Eight Applications Filed for Lewis River Water

Eight water applications seeking use of 1,775 sec.ft. of water on the Lewis River and tributaries in Skamania County, Washington, to develop a total of 90,350, continuous horsepower for power, mining and manufacturing purposes, were filed with R. K. Tiffany, state supervisor of hydraulics Sept. 14 by H. L. Gilbert, Portland, Ore.

Cost of the power development phase of the project, exclusive of four applications for permission to construct reservoirs in connection with the project, is estimated at \$9,055,000. Cost of the four reservoirs, which will store a total of 129,000 acre-ft. of water, is estimated at \$2,900,000, making the estimated cost of the entire project \$11,955,000.

Construction details in connection with the project are meager, a notation on each application blank stating that further study and knowledge of each site was desired before deciding upon the type of dams and the dimensions of the various canals to be built. Dams and canals of the most suitable type and of first class construction are to be built, according to the applications.

The twelve applications were filed in person by H. L. Gilbert, a Portland engineer, who, however, did not elaborate upon the details contained in the various applications.

The Northwestern Electric Company of Portland already has commenced development of a power project on the Lewis River near Yale, Wash., near the location of the various water rights sought by Gilbert.

Charles A. Magrath Named as Ontario Hydro Head

Charles A. Magrath, chairman of the Canadian Section of the International Joint Commission, has been appointed by the Ontario government chairman of the Ontario Hydroelectric Power Commission, succeeding the late Sir Adam Beck.

Mr. Magrath has taken an active part in public affairs for many years. He has been a member of the International Joint Commission since 1911, and since 1922 a member of the federal advisory fuel committee. In 1913 he was chairman of a commission created by the province of Ontario to report upon a comprehensive system of highways, and from 1917 to 1920 he was fuel controller for Canada. During the war he was a member of the Canadian War Trade Board. He is a former president of the Dominion Land Surveyors' Association of Canada and a prominent member of the Engineering Institute of that country. During his early life he spent many years in survey work in western Canada.

Edison Company Asks Permit to Increase Service Deposit

Application has been made to the California Railroad Commission by the Southern California Edison Company, Los Angeles, for permission to increase its service deposit for residence or domestic service from \$2.50 to \$3.50.

The application states that the company's experience has shown that the present deposit of \$2.50 for each service is insufficient to guarantee payment of bills by certain classes of consumers, particularly those of a transient nature, and that the increasing of the service deposit will be a direct benefit to permanent consumers in that uncollectible accounts from transient consumers will be reduced materially.

Three Electrical Organizations to Occupy Same Office

The Electric Club of Los Angeles has announced the removal of its executive offices to 610 Cotton Exchange Building, Third and Main Streets.

The California Electrical Bureau and the California Electragists, Southern Division, also will occupy these offices. It is the belief of the three organizations that the association and cooperation afforded by this plan will be of mutual benefit as well as of service to the industry.

Technical Section Reports to Be in Oct. 15 Issue

The first meetings of the Technical Section of the Pacific Coast Electrical Association for the fiscal year were held in the new building of the Los Angeles Gas and Electric Corporation Sept. 23-25. A full report of the proceedings of this series of meetings will be given in the Oct. 15 issue of the Journal of Electricity.

The next series of sessions will be held in San Francisco about the middle of January, 1926. It will be worth while to be there.

Mountain States Company Moves Headquarters to Tacoma

In order to be located more centrally with respect to the widely separated divisions of the company in Oregon, Washington, Idaho, Montana and Wyoming, the Mountain States Power Company, formerly of Albany, Ore., has moved its headquarters to Tacoma, Wash. The new general offices are located in the building occupied by the Tacoma Gas & Fuel Company, which in common with the Mountain States Power Company is managed by the Byllesby Engineering & Management Corporation, Chicago.

Simultaneously with the announcement of this move, which was effective as of Sept. 1, comes the announcement that C. M. Brewer, vice-president and general manager of the Mountain States company, will assume that position with the Tacoma Gas & Fuel Company, succeeding D. J. Young, who had managed the Tacoma property for some years. Mr. Young will remain with the Byllesby Engineering & Management Corporation in consulting capacity for all gas plants under its supervision, and for the present will continue to make his headquarters in Tacoma.

Other changes in organization effective at this time include the promotion of W. L. Fitzpatrick to become general auditor for all divisions of the company, succeeding N. H. Buckstaff, who has been transferred to the Northern States Power Company.

Steam Power Plant to Be Erected at New Braunfels, Texas

Announcement has been made by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., that it has been awarded a contract for the installation of a complete generating unit of 45,000 hp. in the new steam power plant to be erected at New Braunfels, Texas, for the Coma Power Company. This company is a subsidiary of the San Antonio Public Service Company, which is an American Light & Traction Company holding.

Included in the equipment is a 45,000-hp. turbine, a 37,500-sq.ft. condenser, and a 30,000-kw. generator. The cost of the plant is estimated at \$3,000,000 and is to be built within a year.

Refrigerator Company Acquires Manufacturing Facilities

Announcement has been made that the Serval Corporation of New York, manufacturer of electric refrigerators, has acquired all of the voting stock of the Hercules Corporation.

For the last three years the latter company has been producing, in addition to farm engines, vehicles and equipment, and commercial truck bodies, Serval electric refrigeration units, ice cream cabinets and refrigerators. Its present capacity is estimated at 50,000 Serval domestic refrigerating machines per annum. Installation of additional machinery and equipment is now under way, and the capacity during 1926 will be approximately 100,000 per annum.

The acquisition of the Hercules Corporation, which owns plants at Evansville, Ind., Carteret, N. J., and Newburgh, N. Y., is believed to be the initial move on the part of the Serval Corporation to acquire its own facilities for the manufacture of its electric refrigerators.



News of the Electragists



Los Angeles Electragists Resume Activities and Plan Work

After a suspension of activities during the summer months the Los Angeles Electragists have resumed their regular meetings which are held Tuesday noons and Thursdays nights. H. H. Walker, president, who recently returned to the city after spending six months traveling due to ill health, was welcomed at a recent meeting.

Tentative plans for the coming year also were outlined at this time. It was decided to continue the neighborhood meetings, with occasional general meetings. Frank McGinley, Harbor Electrical Company, Wilmington, Calif., reported on a plan of the Builders Exchange of San Pedro to establish a model home for publicity purposes. This home will be wired according to the Red Seal specifications as an example of an adequately wired home for prospective builders.

Walter Norton of Norton & Norton, Los Angeles, is making an extensive trip through Eastern and Canadian cities. While in the East Mr. Norton attended the Electragist convention at West Baden.

Kendig Brothers of Burbank, Calif., recently have opened a branch store at Lankershim, Calif.

Barnes Brothers of Pasadena, Calif., recently have moved into a new store, which is in a much better location and is larger than their old one.

Sherman Smith of the Huemphreus-Smith Electric Company, Santa Barbara, Calif., is in the East on an extensive business trip.

Sam Fingerhut of the Acme Electric Company, Bakersfield, Calif., was in Los Angeles on business recently.

Fred L. Edwards of the Independent Electric Company, San Diego, was recently in Los Angeles on a business trip.

W. M. Boyce of Mayer & Boyce, San Diego, made a trip to Los Angeles recently on business.

Southern Division of California Electragists Meets Oct. 16-17

General plans have been outlined for the program to be presented at the quarterly convention of the Southern Division of the California Electragists to be held at the Lebec Inn, Lebec, Calif., Oct. 16-17.

There will be a members' meeting Friday evening. At this time each member will be given an opportunity to express himself on the various questions which are brought up. Estimating will be one of the principal problems discussed at this meeting.

Saturday morning will be devoted to a report of the merchandising committee and to kindred subjects. The members have taken a great deal of interest in the work of the merchandising committee, and its report promises to be one of the most important subjects before the convention.

The general meeting will be held Saturday afternoon. A paper entitled, "Financial and Business Problems of the Contractor-Dealer" will be presented at this time. An interesting program of entertainment has been arranged for both men and women in attendance at the convention.

Clyde L. Chamblin, California Electrical Construction Company, San Francisco, was one of the members of the California Electragists who attended the twenty-fifth annual convention of the Association of Electragists, International, which was held at West Baden Springs, Ind., Sept. 23-25.

P. D. Howse, Electrical Products Corporation, and H. B. Woodhill, Woodhill-Patterson Company, both of Los Angeles, recently returned to that city after an extended visit to Canada and New York City.



Lee C. Baltzelle, of the J. J. Farley Company, Fullerton, who has been very active in the Southern Division of the California Electragists. Mr. Baltzelle has given liberally of his time in its behalf, especially in connection with the presentation of the estimating system of the Association of Electragists, International, as outlined in the July 15 issue of the Journal of Electricity (p. 62).

J. F. Zwiener, San Diego electragist, was in Los Angeles recently on business.

S. F. Jones of Winder & Jones, Covina, Calif., was a recent business visitor to Los Angeles.

C. J. Geisbush, secretary of the California Electragists, Southern Division, recently made a trip to Lebec, Calif., to make arrangements for the Southern Division's quarterly convention which will be held there Oct. 16-17.

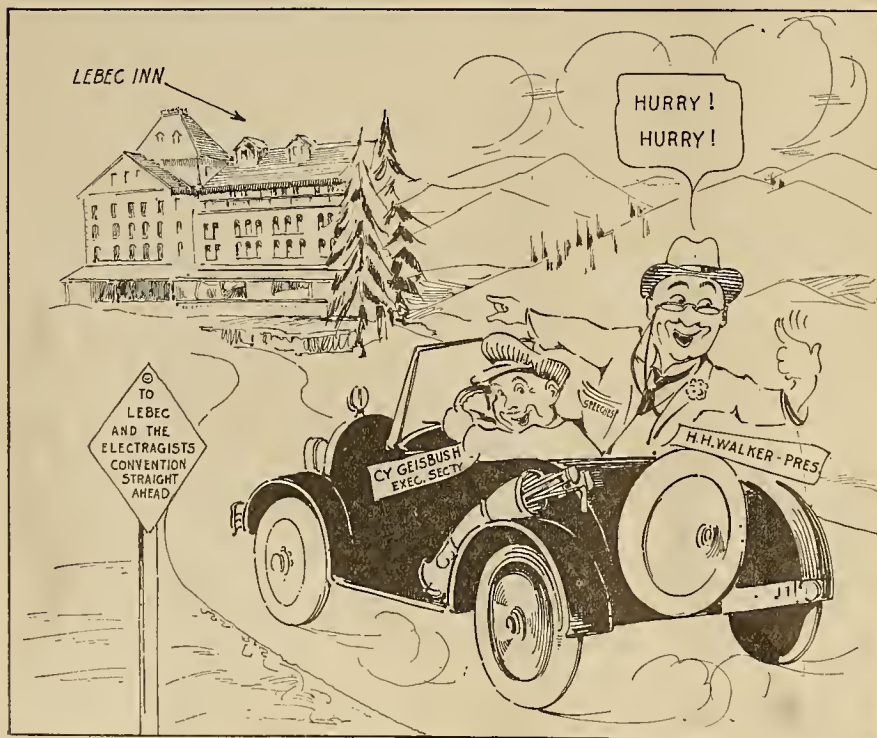
The Yuba-Sutter County Electrical Development Association recently reorganized, changing its name to the Superior California Electric Development League.

M. E. Ryan of Redwood City recently has become affiliated with the California Electragists.

A. L. Woods, formerly associated with the American Electric Company at Torrance, Calif., recently purchased the interests of the other members of the firm and now is operating as the Woods Electric Company in a new location at 1213 Post Avenue, Torrance.

L. C. Hart Electric Company will soon move into the new store building now being constructed by Mr. Hart in Moneta, Calif., that will provide room for a more attractive display of appliances.

R. O. Mullinger, formerly with W. C. Bailless Company, and D. E. Annand, formerly in the sales department of the Sierra Electric Company, Inc., recently have organized The Reliance Electric Service Company, Los Angeles. The company will specialize in the repair and serving of electrical appliances. A special feature of the establishment will be an intercommunicating telephone service department.



Follow the leaders—and arrive at Lebec in time for the meeting Oct. 16

Book Reviews

LIGHTING FIXTURES AND LIGHTING EFFECTS

By M. LUCKIESH, director, Lighting Research Laboratory, National Lamp Works of General Electric Company. 330 pages, illustrated, \$4.00. McGraw-Hill Book Company, Inc.

For many years those actively engaged in the design and manufacture of lighting fixtures and equipment have been handicapped greatly as a result of insufficient scientific information relative to the many complexities with which they are confronted daily. Indeed, their questions often are answered indiscriminately, and as a result many weird and painful conceptions of correct lighting have been thrust upon an unsuspecting laity. This is readily understood when one remembers that the average designer's bookshelves are crammed with volumes dealing solely with creations of bygone eras and a pitifully small showing of reasonably scientific and applicable data suitable to today's requirements.

It is with much satisfaction that Mr. Luckiesh's book will be welcomed by the profession, as well as by the host of other supernumeraries associated with the art. It should prove an invaluable addition to their work. The subject, associated with the lighting art, its history, and of most importance, its proper application, is treated throughout Mr. Luckiesh's work in so systematic and constructive a manner as to prove immensely interesting and at the same time easily digested.

As an introduction, the author treats of the potentiality of light, disclosing its primitive sources, its value in illumination, its prime significance in any medium of decorative or useful art, and presents an outlook upon the future possibilities of this powerful factor of expression.

In systematic and constructive order follow chapters devoted to the influence of light upon our natures, the imprints of usage, the physical and esthetic basis of light and color; in fact, all the elemental phases that enter into proper lighting. The chapter devoted to the principles of lighting equipment is particularly useful, as it illustrates and explains methods employed to accomplish various means of light transmission and reflection. This is valuable in solving many misunderstood problems.

The chapters devoted to the history of lighting, and the illustrations accompanying the various period styles, are highly commendable, inasmuch as this treatise is a digest of the world's progress in lighting equipment from the earliest ages down to our latest approved styles.

Mr. Luckiesh lays particular emphasis upon the fact that today designers are adhering slavishly to reproduction of examples of bygone eras, and merely are replacing candles (the only former medium of light) with electric sockets. He says that they do not use suitable diffusing media and are prone not to pay proper attention to the advantages

at their command. This is indeed true, for we have but to look at the many incongruities glaring at us in our homes and public places to realize only too well the efficacy of Mr. Luckiesh's statements.

Mr. Luckiesh cites as an illustration the old schoolhouse. It had dark woodwork, for maintenance was a first consideration. It had improper ventilation. It was lighted by means of lamps glaringly exposed and intensified by porcelain diffusing plates. The surroundings were sordid and depressing. As a consequence, the instincts of the children rebelled, their eyes were affected, their morale lessened. Today the modern schoolhouse with its cheerful and light-colored walls, its proper diffused light, scientifically studied surroundings, offers a vivid contrast.

As a whole the book is a decidedly useful and much needed text and should prove of utmost value to those who believe in the scientific and correct development of their craft. C.J.F.

Meetings

Electrical Supply Jobbers Hold Enthusiastic Meeting

The quarterly meeting of the Pacific Division of the Electrical Supply Jobbers' Association, held at the Hotel Del Monte, Del Monte, Calif., Sept. 24-26, was an enthusiastic one, and much interest was evinced by the delegates in the different matters brought up at the sessions.

A number of important problems was discussed, and a resume of those discussions and the conclusions arrived at, together with a report of the other events at the convention, will be published in the Oct. 15 issue of the Journal of Electricity.

COMING EVENTS

Technical National Section, N.E.L.A.—
Group Meetings:

Detroit, Mich., Book Cadillac Hotel
Oct. 6-9, 1925

California Electragists, Southern Division—
Quarterly Meeting—Lebec Inn, Lebec, Calif.
Oct. 16-17, 1925

National Association of Railroad and Utilities
Commissioners—

Annual Convention—Washington, D. C.
Oct. 13-16, 1925

Kansas City, Baltimore Hotel
Feb. 9-12, 1926

Electrical Folks of Salt Lake Hold Annual Outing.—The annual outing of the members of the electrical industry of Salt Lake City and surrounding territory was held at Lagoon, a summer resort 18 miles north of Salt Lake City, on Sept. 1. A large number of people were in attendance, and a lively program of athletic events was conducted during the afternoon, followed by a dinner and dancing in the evening. Electrical prizes, contributed by various electrical concerns, were awarded the winners of the various contests.

Technical National Section to Hold Two Group Meetings

Two group meetings of the Technical National Section, N.E.L.A., will be held this year, according to announcement from New York. These two meetings will be of importance to technical men in all branches of the electric service industry. It is to be hoped that the cooperation of Pacific Coast companies in sending representatives to these sessions will be at least as good as it was last year. Contact between the national technical organization and that of the Coast division is an economic desirability.

The first of these sessions will be held at the Book Cadillac Hotel in Detroit Oct. 6-9. The second series of meetings will be held at the Baltimore Hotel in Kansas City, Feb. 9-12, 1926. Special note should be taken of the fact that Detroit operates on Eastern Standard time while most of the railroads thereabouts operate on Central Standard time. All Detroit meetings will be according to Eastern Standard time.

The chairman of the Technical Section is C. F. Hirshfield, The Detroit Edison Company, Detroit, and the chairmen of the various committees are as follows: Accident prevention—C. B. Scott, Bureau of Safety, Chicago; electrical apparatus—E. C. Stone, Duquesne Light Company, Pittsburgh; hydraulic power—R. L. Thomas, Pennsylvania Water & Power Company, Baltimore; inductive co-ordination—H. S. Phelps, The Philadelphia Electric Company, Philadelphia; meter—A. G. Turnbull, Commonwealth Edison Company, Chicago; overhead systems—H. C. Sutton, The United Gas Improvement Company, Philadelphia; prime movers—A. D. Bailey, Commonwealth Edison Company, Chicago; underground systems—C. H. Shaw, The New York Edison Company, New York.

New Officers Elected by Seattle Electric Club

At a meeting of the Electric Club of Seattle held Aug. 24, the first since the summer vacation, David M. Roderick, district manager of the Hoover Suction Sweeper Company, was elected president to succeed Harry J. Martin of the National Carbon Company, who held that position for the past two years. The new president was installed in office at the second meeting of the organization Aug. 31.

Other officers named to assist the new president during the ensuing year follow: T. S. Wood, vice-president; E. A. Irons, Westinghouse Lamp Company, treasurer; P. L. Hoadley, representing Stanley & Patterson, re-elected secretary. The directors are: Harry J. Martin, permanent chairman; G. C. Burke, City Electric Company; R. M. Cole, Fobes Supply Company; A. E. Griswold, A. G. Manufacturing Company; R. E. Thatcher, Puget Sound Power & Light Company; George T. Thirsk, electrical engineer.

Railroad and Utilities Commissioners to Convene.—The annual convention of the National Association of Railroad and Utilities Commissioners will be held at Washington, D. C., Oct. 13-16. Correspondence with regard to the meeting should be addressed to James B. Walker, 270 Madison Avenue, New York City.

Personals

C. A. Semrad, vice-president and general commercial manager, Public Service Company of Colorado, Denver, who was elected president of the Rocky Mountain Division, N.E.L.A., at its 1924 convention, and who has been the acting president since the departure of Norman Read, the former president, received official confirmation of his elec-



C. A. SEMRAD

tion to that office at the convention held at Glenwood Springs, Colo., Sept. 14-17. His term will expire June 30, 1926. Mr. Semrad is well known in the electrical industry, particularly in the West, having been closely connected with it for a number of years. Graduating from the University of Wisconsin in 1908 as an electrical engineer, he became instructor in hydraulics and water power there. Later he joined the Union Light & Power Company of St. Louis, Mo., leaving to become cadet engineer with the Northern Colorado Power Company. In 1914 he became general manager of the Cheyenne Light, Fuel & Power Company, a Western Light & Power Company holding, and four years later was made general manager of the latter organization. Upon the merger of that company with the Denver Gas & Electric Light Company in 1923 Mr. Semrad was made directing head of the western division of the Public Service Company of Colorado, the newly formed company. He has been prominent in the organizational affairs of the industry, taking an active part in the N.E.L.A. as a member of the Rocky Mountain Division. In the recent national Home Lighting Campaign he served as vice-chairman of the regional committee and as state chairman for Colorado.

Ruth Creveling, research librarian, and Nell Molloy, secretary to the general manager, San Diego Consolidated Gas & Electric Company, were recent visitors to San Francisco.

A. O. Marston has assumed the duties of secretary of the Los Angeles Electric Club, the position formerly occupied by W. A. Knost.

E. J. Adams, representing the United Electric Company, Canton, Ohio, was a recent visitor in San Francisco.

B. F. DeLanty has been appointed general manager of the Municipal Light and Power Department of Pasadena, Calif., succeeding C. W. Koerner, former city manager, who also served as head of the city light and power utility. Mr. DeLanty has been connected with the department for eighteen years.

C. M. Teats, for the last four years representative of Moe-Bridges Company in Los Angeles, has been made manager of that company's newly opened branch office in that city.

James F. Pollard, general manager of the Coast Valleys Gas & Electric Company, Salinas, Calif., and H. K. Griffin, superintendent of the commercial department of the Western States Gas & Electric Company, Stockton, were in San Francisco recently to attend the organization meeting of the Industrial Lighting Committee. Both were appointed vice-chairmen of the committee in charge of activities in their respective fields.

R. E. Fisher, vice-president in charge of public relations and sales, Pacific Gas and Electric Company, San Francisco, with Mrs. Fisher left Sept. 22 for an extended trip through eastern centers. He expects to spend some time in Chicago, New York, Boston and Washington where he will make a special investigation of the progress made in domestic refrigeration and prospective new industries seeking locations on the Pacific Coast. He also will attend the meetings of the American Gas Association, Society for Electrical Development and the National Electric Light Association.

J. W. Wrenn, manager of the Appliance Sales Department of the Great Western Power Company, San Francisco, recently addressed the Sciots at a luncheon, choosing as his subject "The Most Important Application of Electricity in the Home."

T. F. McDonough, Los Angeles district representative, Benjamin Electric Manufacturing Company, recently became a member of The Electric Club of that city.

D. M. Patterson, formerly with the Southern California Telephone Company at Alhambra, Calif., has been appointed assistant to A. R. Whisler, district agent of the San Diego Consolidated Gas & Electric Company at Oceanside, Calif.

H. T. Plumb, special engineer for the General Electric Company with headquarters in Salt Lake City, recently spoke before the weekly luncheon of the Engineering Council of Utah. His address dealt with reminiscences of his recent trip which took him through the East and to Schenectady, N. Y., the headquarters of the General Electric Company.

R. A. Balzari, manager of the Industrial Division, Westinghouse Electric & Manufacturing Company, San Francisco, was among the delegates attending the Pacific Coast convention of the American Institute of Electrical Engineers at Seattle.

A. M. Frost, commercial manager, San Joaquin Light & Power Corporation, was a recent visitor in San Francisco. As chairman of the Pacific Geographic Division of the Industrial Lighting Committee, National Electric Light Association, he discussed its activities with Clark Baker, chairman of the lighting bureau committee of the Pacific Coast Electrical Association.

W. W. LaBarr is in charge of the branch sales office newly opened in Los Angeles by The Packard Electric Company, Warren, Ohio.

H. E. Posz, F. A. Huth, C. O. Knox, and C. A. Schrader have been added to the sales force of the Moe-Bridges Company, covering, respectively, the territories of Seattle, Portland, Fresno and Sacramento. E. Earl Ingalls will cover the San Francisco territory.

C. D. Slaughter, manager of Allied Industries, Inc., San Francisco, is making an extensive trip to the Eastern coast where he will visit all the factories represented in the Western states by his firm.

A. E. Griswold, president of the A-G Manufacturing Company, Seattle, was a recent visitor in California, motoring through the state as far south as San Diego.

L. J. Bergman, for many years connected with the Pass & Seymour Company of Syracuse, recently arrived in Los Angeles to represent his company in the southern California territory.

Carl Wiggins, superintendent of electric production, San Diego Consolidated Gas & Electric Company, San Diego, Calif., motored to St. Paul, Minn., to attend the A.I.E.E. national convention held there.

W. D. Johnston has been appointed general manager of the Wyoming division of the Mountain States Power Company, the Byllesby holding which took over the Natrona Power Company at Casper, Wyo., and its smaller subsidiaries. His electrical experience dates back to 1909 when he became associated with the Nunn interests in the operation of the Telluride Power Company of Utah. Mr. Johnston was awarded a scholarship in 1912 by the



W. D. JOHNSTON

Telluride association, the educational foundation established by L. L. Nunn in connection with Cornell University, and in 1917 graduated with the degrees of A.B. and M.E. For three years following his graduation he was designing and power engineer for the Bell Telephone Company of Pennsylvania, and since 1920 has been general superintendent of the Natrona Power Company at Casper, Wyo., a Nunn subsidiary, under the direction of E. P. Bacon whom he succeeded when the company was sold to the Byllesby interest and Mr. Bacon formed another company. Mr. Johnston is one of the youngest utility company executives in the Rocky Mountain region.

W. E. Martin, manager of the marine sales division, Westinghouse Electric & Manufacturing Company, San Francisco, lately returned from a six-week trip through the Eastern states.

Jacob Bunn, president, Sangamo Electric Company, Springfield, Ill., and R. G. Lanphier, vice-president and general manager of the same company, accompanied by A. D. Mackie, vice-president, Illinois Power Company, Springfield, were recent visitors in San Francisco enroute to Los Angeles and Mexico City.

W. S. Dunlap, formerly associated with the Southern California Edison Company and the Great Western Power Company, has joined the sales force of the Majestic Electric Appliance Company, Inc., San Francisco, with headquarters in Minneapolis.

W. A. Cyr, former editor of "Glow" and its successor, the "News-Meter", for the San Diego Consolidated Gas & Electric Company, has joined the staff of the Journal of Electricity to succeed J. W. Otterson, associate editor. In the three years he has been connected with the electrical industry, Mr. Cyr has been identified with the San Diego utility, editing the company publication. He has been an active worker in the San Diego Electric Club as chairman of its program committee and member of its executive committee. The publicity for the 1924 convention of the Pacific Coast Electrical Association was under his direction. Prior to entering the electrical industry Mr. Cyr had a varied publishing career, which began during the war when he edited the official paper of the 16th Division, "Trench and Taps". Upon his discharge from the army he became connected with the Community Motion Picture Company as assistant director



W. A. CYR

and later in charge of its Los Angeles office. Later he took on the editorship of a country weekly, "The Parlier Progress", adding shortly afterward the editorship of the "Alta Advocate" of Dinuba, Calif. Returning to San Diego, Mr. Cyr took an editorial position on the staff of the San Diego Union and Tribune, which he held until joining the San Diego Consolidated Gas & Electric Company. During the three years he was connected with the utility he has acted as San Diego correspondent for the Journal of Electricity. At the time of the recent San Francisco convention of the N.E.L.A. he was one of the assistant editors of the "Convention Daily".

J. Allan Smith, Jr., formerly with the washing machine department of the Pacific States Electric Company, has become a member of the sales force of the Majestic Electric Appliance Company, Inc., San Francisco. He has established headquarters at Dallas, Texas.

Paul R. Prietsch, assistant to Ray W. Murphy, Pacific Coast district manager for the Westinghouse Lamp Company, spent ten days in Los Angeles during September making a survey of the Los Angeles territory in collaboration with O. E. Thompson, Los Angeles branch manager for the lamp company.

H. G. Glass, formerly western representative of The Hoover Company, North Canton, Ohio, has been transferred to the position of Western executive sales manager. His territory covers all of the company offices west of Indiana.

George M. Rankin, field representative for the California Electrical Bureau for the San Joaquin and Sacramento Valleys, was a visitor to San Francisco recently in connection with the launching of the Industrial Lighting campaign.

P. M. Parry, commercial manager of the Utah Power & Light Company, Salt Lake City, attended the recent N.E.L.A. Rocky Mountain Division convention at Glenwood Springs, Colo.

William Baurhyte, president, Los Angeles Gas & Electric Corporation, and president, Pacific Coast Electrical Association, left Los Angeles Sept. 20 for a trip East. While away he will attend the American Gas Association convention and also the meeting of the Executive Committee of the N.E.L.A. to be held in Chicago Oct. 26.

R. P. Waite, formerly with the Texas Light & Power Company, Dallas, has resigned to accept the position of chief engineer of the property department of the Atlantic Oil Producing Company of that city, a subsidiary of the Atlantic Refining Company of Philadelphia.

B. A. Graham, formerly the Chicago representative of the Chicago Flexible Shaft Company, manufacturers of the Sunbeam iron, has been transferred to San Francisco to act as that company's California representative.

J. R. Cravath, consulting illuminating engineer of San Francisco and chairman of the San Francisco Bay Cities Chapter of the Illuminating Engineering Society, is now in the East. While there he attended the nineteenth annual convention of the Illuminating Engineering Society which was held in Detroit Sept. 15-18.

T. M. Simpson, formerly with the Great Western Radio Corporation is now associated with the Great Western Power Company at San Francisco.

W. H. Colman, district manager of the merchandise department of the General Electric Company, with headquarters in Chicago, was a recent visitor in Denver. L. J. Johnson, district representative of the same company, was also a visitor in Denver.

C. D. Russell, for a number of years in the sales department of the Pacific States Electric Company, Los Angeles, has resigned recently to accept the position of educational director of the Broadway Department Store of that city.

W. C. Sadler, engineer on the Cushman power project of the city of Tacoma, Wash., has resigned to accept a position as assistant professor in the School of Railroad Engineering, University of Michigan, Ann Arbor, Mich.

W. J. Dennis, for the past year assistant to the general manager of the Northwestern Electric Company, Portland, recently was appointed assistant general manager of the company. Mr. Dennis was born in Houston, Texas, in 1881, and received the major portion of his education in the public schools of that city. At the age of twenty-one he went to Portland where he became identified with the Ames, Harris & Neville Company, manufacturers of burlap and cotton bags, later rising to be plant superintendent. In 1912 he made his entry into the public utility field in the sales department of the Portland Railway, Light & Power Company, now the Portland Electric Power Company,



W. J. DENNIS

remaining about a year. When the Northwestern Electric Company commenced operations in the city in 1913 Mr. Dennis joined the sales department of that company, remaining in this work until February, 1924, when he was made assistant to the general manager.

A. G. Wishon, vice-president and managing director, San Joaquin Light & Power Corporation, Fresno, recently visited San Francisco.

B. L. Parker, for the past seven years associated with the sales department of the Western Electric Company, Omaha, is now a salesman for the Majestic Electric Appliance Company, Inc., in that city.

G. L. Stannard, formerly with the Scheeline Manufacturing Company, San Francisco, has resigned to become Western manager of the merchandising division of the Federal Telegraph Company with headquarters in San Francisco.

Obituary

W. E. Dunn, one of the pioneers in the electrical development of southern California, died Aug. 22 at the age of sixty-four. He was born in Michigan and went to southern California about thirty-five years ago. At the time of his death he was a director of the Southern California Edison Company, vice-president of the Los Angeles Railway Company, and was interested in a large number of other enterprises.

TRADE NOTES

Aladdin Manufacturing Company, Muncie, Ind., recently has issued catalog No. 25, which has twenty pages devoted to descriptions and illustrations of every type of lamp manufactured by the company.

The Autocall Company, Shelby, Ohio, has issued a descriptive and illustrated booklet of the Autocall line of signaling equipment. The booklet describes the paging system, fire alarm systems, local supervisory systems, fire bells, fire boxes, relays and control panels of the equipment.

Charles Cory & Son., Inc., New York City, has issued recently bulletin No. 201-29-A, which gives descriptions and sizes of its seamless metal hose.

The Schwerin Electrical Appliance Corporation, San Francisco, is erecting a factory in Oakland, Calif., that is expected to be in operation in about ninety days. This company manufactures Schwerin pressed glass flush switch, receptacle and convenience outlet plates.

W. W. Kirk, who represents the Delta-Star Electric Company and the Niagara Electric Improvement Corporation on the Pacific Coast, has appointed **N. W. Paterson** his agent for northern California. A stock of Delta-Star material is to be kept in San Francisco as well as in Los Angeles.

Moe-Bridges Company, Milwaukee, Wis., has announced the opening of a factory branch at 1026 Wall Street, Los Angeles, in charge of **C. M. Teats**, who has been the company's representative in that territory for the last four years. This branch, the company believes, will enable it to render better service to its dealers in southern California, Arizona and New Mexico. **B. J. Wildman**, Pacific Coast manager, also has announced that **H. E. Posz** has been placed in the Seattle territory, **F. A. Huth** in Portland, **C. O. Knox** in Fresno, and **C. A. Schrader** in Sacramento. **E. Earl Ingalls** will cover the San Francisco territory.

C. H. Babcock Company, 768 Mission Street, San Francisco, has moved its office to its warehouse address, 135 Bluxome Street, that city.

Sangamo Electric Company, Springfield, Ill., recently has moved its San Francisco office and warehouse to 1061 Howard Street, that city.

Irrington Varnish & Insulator Company, Irvington, N. J., has announced the appointment of **Charles E. Garneau** as sales manager.

The Packard Electric Company, Warren, Ohio, has established a branch sales office in the Chamber of Commerce Building, 1151 South Broadway, Los Angeles, in charge of **W. W. LaBarr**.

Wappat Gear Works, Pittsburgh, Pa., has placed on the market recently a new portable electrically driven lock mortiser to be known as the Alta lock mortiser, which it is claimed cuts the time for mortising on doors and windows to 1/30 of the time previously required. With this motor-driven mortiser the ordinary mortise can be cut in one minute.

Square D Company, Detroit, has brought out a new motor starting switch for use with time limit protective cutouts. The switch can be used with motors of 3 hp. and below on 110 volts and with motors rated above 3 hp. up to and including 5 hp. on 220 volts. The switch is made in a very compact form.

Sangamo Electric Company, Springfield, Ill., has developed a distant dial which it claims operates on alternating current, thus eliminating the need for batteries.

The Myers Radio and Electric Shop has established a store at 12th and Stout Streets, Denver. The business will be confined to sale and repair of radio and electrical equipment.

The R. & R. Electric Company was opened recently at 812 Valencia Street, Los Angeles. The firm will specialize in the design and manufacture of distinctive lighting fixtures. The members of the firm are **R. E. Rogers**, formerly sales manager of the Skelton-Wise Electric Fixture Manufacturing Company, and **G. E. Ramey**, formerly of the sales department of Solar Lighting Fixture Company.

The Electric Heating & Manufacturing Company, Seattle, Wash., manufacturers of **Apfel's** 100 per cent system of electric heating, announces the removal of its factory to its own recently completed plant at Sixth Avenue North and Harrison Street. The building, a concrete structure, was built especially for the company and is peculiarly adapted to the uses to which it will be put.

Curtis Lighting, Inc., Chicago, is introducing four new X-Ray reflectors known as Jack No. 400, Jill No. 410, King No. 500 and Queen No. 510. The first two are designed to accept 100 or 150-Watt Mazda "C" lamps, and the other two for 200-watt Mazda "C" lamps. A special shade-holder is supplied with each of these reflectors at no additional cost. In an announcement relative to this company in the Aug. 15 issue of the Journal, p. 156, its reflectors Jove No. 600 and Jupiter No. 610 were referred to as having been developed recently. This statement was made in error, as these reflectors have been on the market for the past fourteen years.

H. J. Gute & Company, San Francisco, have taken the agency for the Aladdin line of low-priced lamps. The line contains numerous styles, including desk, boudoir, table and flexible lamps, as well as metal-stand silk-shade floor lamps. They also are acting as agents for the Getz washing machines. The concern also represents the **Frank E. Wolcott Manufacturing Company**, Hartford, Conn., which recently has developed a \$10 waffle iron, full size, a toy electric flat iron weighing less than 1 lb., and a 4-piece hairdressing set composed of deep waver, drying comb and curling iron.

Utica Products, Inc., Utica, N. Y., has put on the market a 600-watt portable electric furnace, which retails on the Pacific Coast for \$12 and is claimed to be very efficient. One feature to which particular attention is invited is that the furnace is finished in Duco everlasting finish and, on account of the cool sides and bottom of the heater, may be painted.

Hynes & Cox Electric Corporation, Albany, N. Y., recently has developed a new electric pipe heater, which it is claimed can be mounted in any position on any size pipe. The illustrated literature fully describes the features of this device.



At first glance it would appear that the genial gentleman here depicted would have to do some "tall" explaining. In order to dispel any suspicion of scandal, we hasten to state that the photograph was taken in the studio of **J. U. Berry**, display manager of the Valley Electrical Supply Company, Fresno, and that the plump person in the foreground is **Gaskell S. Jacobs**, consulting engineer, San Joaquin Light & Power Corporation, who obligingly consented to pose with the three lovely ladies shown. A more careful scrutiny will reveal these charmers as the cardboard figures of the Westinghouse and Mazda lamp advertising program.

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

a New JOHNSON WASHER combining



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Beautiful, Durable, Convenient.

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that floats with the load—Speed,
Gentleness, Thoroughness.

CENTRAL STATIONS and DEALERS—

tie up with the New Johnson
Washer and end service trouble.
Our sales franchise may be open
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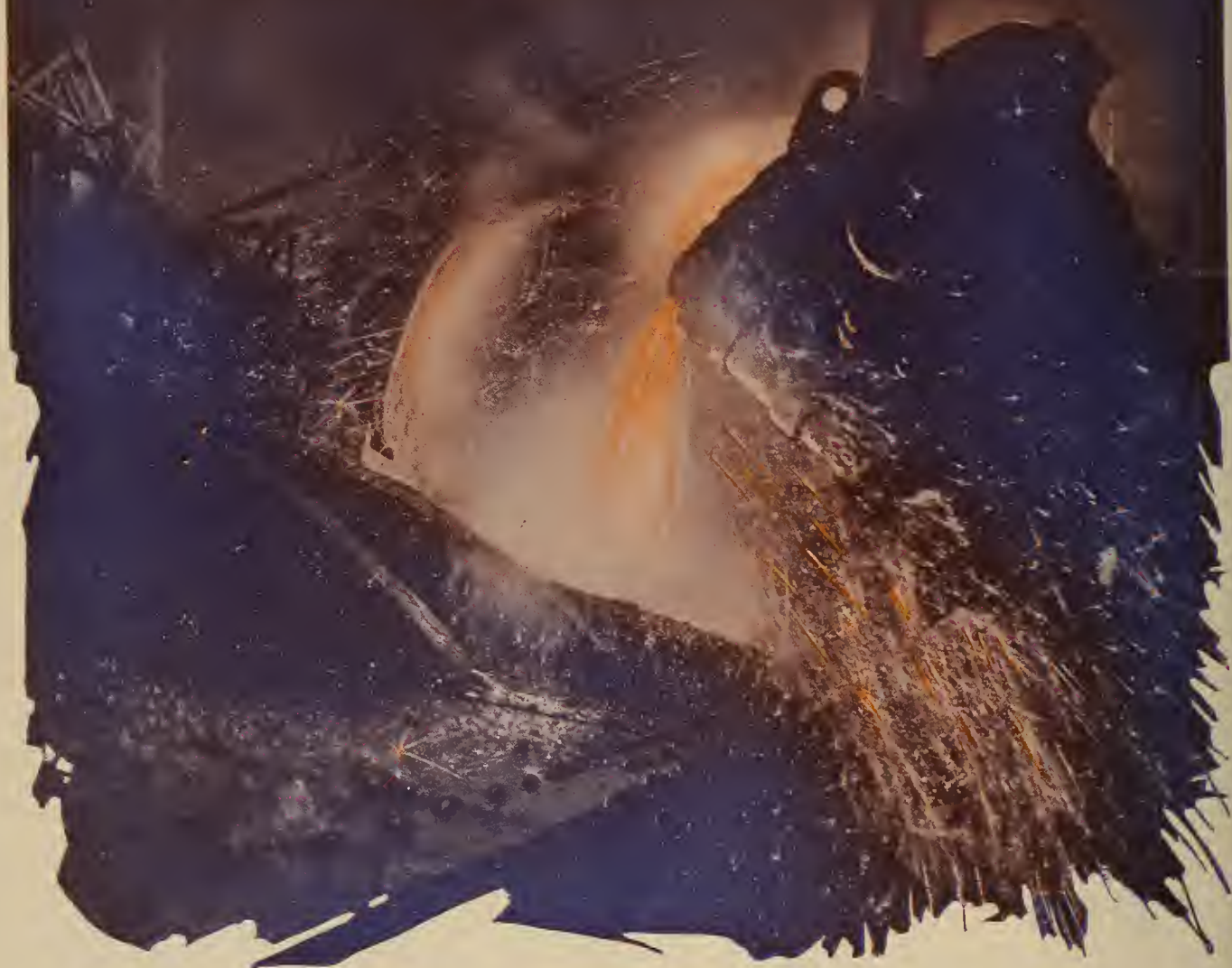
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Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

G. R. HENNINGER, Associate Editor
R. N. PHELAN, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

W. A. CYR, Associate Editor
B. H. SNOW, Northwest Editor

VOLUME 55

SAN FRANCISCO, OCTOBER 15, 1925

NUMBER 8

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McGRAW-HILL COMPANY OF CALIFORNIA — 883 Mission St. — SAN FRANCISCO

Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

JAMES H. MCGRAW
PRESIDENT

C. T. HUTCHINSON
VICE-PRES. & GEN. MGR.

J. W. OTTERSON
SECRETARY & TREASURER

WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave. at 36th St.

Subscription rates in United States, Canada,
Mexico, Porto Rico, U. S. Possessions, Argen-
tina, Bolivia, Brazil, Colombia, Costa Rica,
Cuba, Dominican Republic, Ecuador, Nicara-
gua, Panama, Guatemala, Paraguay, Peru,
Honduras, Salvador, Uruguay, and Spain, \$2.00
per year, 2 years \$3.00. Elsewhere \$3.00 Gold
(13 Shillings). Single copy, 25c. When change
of address is required, both old and new ad-
dresses must be given. Notice
must be received two weeks
before change takes place.

Copyright, 1925

By McGraw-Hill Company
of California

Entered as second-class mat-
ter Feb. 17, 1921, at the Post
Office at San Francisco, Cali-
fornia, under Act of March 3,
1879.

Member Audit Bureau of
Circulation

Printed in U. S. A.

A Noteworthy Issue

THIS is a noteworthy issue of the Journal of Electricity, both from the value of the statistical matter contained in it, and as a means of interpreting the signs of the times in the development of load-building in the eleven Western states.

The studies of the programs of the central stations in the merchandising of appliances for the purpose of increasing the domestic load are significant, and, to our knowledge, this is the first time that any publisher has offered to his clientele so comprehensive a survey of this interesting subject. Here are presented not merely the bare figures of volume of sales for the various appliances, but accurate information as to sales methods, trade regulations, and the different bases for the compensation of salesmen.

Then there are also the annual surveys showing Western distributing outlets, and the manufacturers' directory, requiring an infinite amount of careful compilation in order to present the data in as nearly complete form as possible, carefully indexed for ready reference. There could be no more vivid presentation of the value of the Western market for electrical goods, nor of the increasing realization on the part of manufacturers that this field is worthy of careful cultivation.

As an advertising medium this issue will be alive and active until its successor appears a year hence. This annual issue has established itself as an authority through its value as a reference work, the demand for additional copies always exceeding the supply.

In order to anticipate the demand, the publishers have printed 500 additional copies over the normal press run. These are offered at 50 cents each as long as they are available. Our readers are urged to place their orders as promptly as possible for such extra copies as they may require.

McGRAW-HILL CO., Inc., New York
Publishers of

American Machinist—European Edition

(Published in London)

Industrial Engineer (Published in Chicago)

Electrical Merchandising

Chemical and Metallurgical Engineering

American Machinist

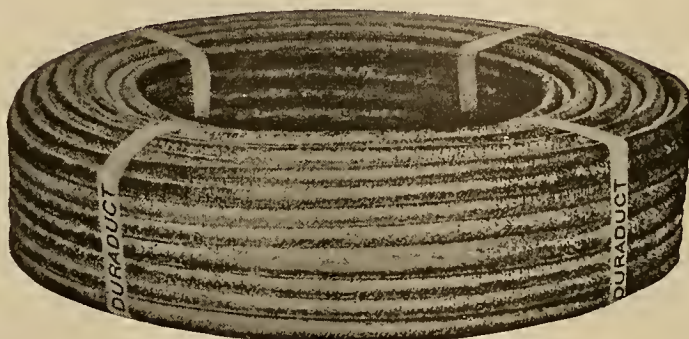
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EDITORIAL

Fully Equipped

THIS issue tells the story of merchandising appliances in the eleven Western states, and especially the development of central station merchandising as far as it has gone. There are tables, a symposium on many of the details entering into sales organization, and other data, all having taken a great deal of labor and effort in compilation.

NEVERTHELESS, valuable and informative as these data are, we would venture to direct special attention to the article entitled "Coolie Wages," by Richard E. Smith of the Southern California Edison Company, in which there will be found a wealth of philosophy well worth careful study and reflection.

"COOLIE Wages," the bit that is paid almost grudgingly to the central station for one month's service—the price of a golf ball or two, a caddy fee for eighteen holes, a tip for the waiter after a good dinner for two or three people—that is the average wage for electrical service in the home.

SO we are trying to learn something about that which is presumably our business. Our central stations are waging great campaigns to spread the gospel of the electric servant in the home, the lightener of domestic burdens, the eliminator of household drudgery. Therefore, let us try and rationalize our thinking as applied to things electrical. We do not consider the installation of a bathtub today, and a water heater a year hence, nor lighting fixtures when our house is built, to be followed by the purchase of globes at some

future date. Is this any more absurd than to buy electrical equipment for a home over a period of years? We think not.

TWENTY years ago the automobile manufacturer used to sell his car at an advertised price, and when the buyer came to take delivery he found that he had to purchase a windshield, a top, a starter, headlights and all sorts of other accessories before he could drive away in triumph. This practice ceased long ago in the automobile trade, but it is just beginning to excite comment in the electrical industry. Better late than never, of course, but let us not take too much time for the consciousness of our laxity to bring about a much needed reform.

THIS is not a matter for any one branch of the industry alone. The central station salesman should preach the gospel of complete electric service and bring about such service as quickly as its many advantages can be made apparent to every householder. The trade, the manufacturer, the jobber and the retailer should absorb to the full the 100 per cent electrical idea and promote it with every power at their command. The contractor never under any circumstances should try to lower wiring and outlet standards merely to obtain for himself a wholly fictitious advantage in presenting estimates of first cost. Instead he should point out the advantages of adequate wiring, should raise rather than lower standards.

"FULLY equipped" is the slogan for the electrical industry today. Let us be content with nothing short of that mark.

Nursing the Prospect for the Dealer

IN some instances, when meetings are being held to discuss co-operative methods whereby power companies and dealers may benefit from some national or sectional activity, such as a lighting sales plan, there are those who express a dependence upon the power companies which is not entirely commendable.

Where prospects are to be apportioned by representatives of a power company, it is indeed a poor salesmanship which expects the power company to conduct the rest of the sale up to the very point of the actual wiring job, leaving the one so benefited to garner the profits without any undue effort. It is all very well to expect each unit of a sales organization, in which the power company is a leading member, to do its share of the activity; but it is not so well to expect one member of the group to carry all of the sales load.

As a rule, dealers in electrical merchandise are willing and anxious to stand upon their own feet, asking only that they be given a fair dealing by those with whom they combine efforts to sell their products. They do not relish the idea of depending upon the larger organization to nurse along the prospects which have been assigned to them, preferring by far to make their own sales, so that they may be sure that they are made right, made with a full understanding of the position of the dealer, of his conditions of sale and of his guarantees.

That He Who Rents May Enjoy Electrical Convenience

DESPITE efforts of the realtors to establish everyone in a home of his own, there remain many, especially in the cities of the Pacific Coast region, who rent their homes. And be they unfurnished rooms, apartments, flats or even bungalows, such tenants are at the mercy of their landlords for the extent of their electrical convenience.

With those appliances which may be plugged into the dining-room ceiling fixture, with more or less electrical inconvenience, or for the washing machine which can, by virtue of two-way sockets, be tied to the kitchen or back porch hanging cord, the renter, depending upon his disposition and desire for electrical advantages, may get along after a fashion.

But as regards the major appliance, the range, water heater, or air heater, where special wiring is necessary, the renter is at a disadvantage. Even the installation of a kitchen lighting unit is a matter of question in a great many cases.

When confronted by such a situation, the temptation is to give a helpless sigh, shrug the shoulders, and admit that there are many places into which electricity cannot go. The obstacle of the landlord is too terrifying, too hopeless.

But is it? As long as so great a percentage of possible buyers of electrical merchandise are hidden behind the smoke screen of a "landlord bogey," a rich field will remain comparatively unexplored. Just what means should be undertaken to educate and sell the landlord on wiring which will permit the use of more electrical appliances, certainly should be-

come the subject of real study. As long as the landlord holds the keys to a large potential sales territory, it is to him that attention must be directed, in order that he may unlock the doors for the industry to go through.

Rewiring Homes Offers Fertile Field for Contractors

IN the opinion of economic experts, it is believed that the building boom will reach its peak by the end of 1925 and that next year will show a reduction in the amount of building and a general stabilization of building activities. This will mean a reduction in the volume of new domestic electric wiring, not in the sense that the construction of new homes will cease entirely but that the abnormal volume which has held for the past four or five years will show a marked decrease.

This situation bears upon the electrical industry from two directions. In order to maintain the present dollar-and-cents volume of electrical contracting, more attention will have to be paid to quality jobs. Here is where the Red Seal campaign will have its effect. But more important still, such situation will mark the beginning of a new cycle for the industry—a period of rewiring homes already wired. In every community there are thousands of homes with no convenience outlets, with antiquated fixtures and with no provisions for electric ranges and electric water heaters. This work will go to the man who can point out potential opportunities for service and convenience with each additional outlet. It will be a sales job which will require more than the usual amount of imagination and one which will yield profits in the ratio of the amount of work and thought given to each sale.

This job of modernizing the wiring and electrical equipment of homes that were not constructed originally to give the owners the maximum comforts which electric service affords is a task to which the entire industry and the contractors in particular can afford to give thought and attention.

How Shall They Know If We Do Not Tell Them?

IN his epistle to the Romans St. Paul asks the question, "How shall they believe in him of whom they have not heard and how shall they hear without a preacher?" To paraphrase the words of the apostle and bring them up to date, we might ask, "How can the public believe the utility story if they do not hear it, and how can they hear the story if the utilities do not tell it?"

The answer is found in the Rocky Mountain states. For the past three years the Rocky Mountain Committee on Public Utility Information has conducted courses in public speaking, especially among the younger employees in that district. Through these efforts there has been produced during that time a corps of trained young men and women who are well versed in the art of public speaking and who know the utility story through the training they have received. The committee goes one step farther. It also maintains a speakers' bureau and furnishes to

the industry material that might prove useful in the preparation of addresses or papers on utility subjects. Every effort is made to see that the public can and will be properly informed regarding the purpose and activities of the utilities in that district.

This procedure might be followed by many of the large utility companies. It would be a simple matter to organize classes among employees in various districts and to secure from the personnel of the utility itself men qualified to act as instructors. Then when the occasion arose, speakers could be furnished upon a moment's notice. Especially in these western states where the utilities are frequently the centers of political discussion and attack does the industry need a corps of "preachers" who can spread the "gospel" of the central stations.

Standardization of Electrical

Ordinances Needed in California

THE rules covering electrical installations in various cities are frequently cumbersome in themselves and contradictory as between different cities. A manufacturer making a product which is satisfactory for use in one city frequently finds it will not be permitted in another city only a few miles distant. A contractor operating in more than one locality finds the same condition regarding installations. Journeymen electricians frequently go from city to city; they find that work which was acceptable in one place is not allowed in another. All of this has resulted in losses of money and time, in addition to the inconvenience it has caused.

Steps have been taken by the California Association of Electrical Inspectors to remedy this condition. This organization is advocating a uniform ordinance for all cities, and discussed this subject at considerable length at its convention recently held in Fresno, as told elsewhere in this issue. It was suggested that the National Electrical Code and the Electrical Safety Orders issued by the Industrial Accident Commission of the State of California be included as the basis of such an ordinance; and a committee has been appointed to work on this problem of standardization of local ordinances. Standardization and simplified practice in all industries are being urged by the United States through the Department of Commerce. The Association is furthering this work as it applies to electrical ordinances; it should be encouraged in its efforts.

Not Self-Sufficiency but Cooperation Makes for Progress in Industry

SOME time ago an interesting fiction story was published about a man who thought he was the whole show. As a matter of fact he was not and it took him some time to find it out, with disastrous results to his pocketbook and to his self-esteem.

The advancement in the electrical art is not due to any one individual, to any one organization nor to any single group. Each has contributed its bit to the sum total of human knowledge, and the intelligent thinking worker in the industry realizes his own dependence upon his fellow workers and is willing to contribute his bit in exchange for what he learns from others. Cooperative movements as a

rule are made up of the intelligent efforts of the thinkers whose broad viewpoint convinces them of the desirability of giving generously of their store of knowledge in order that they may partake of the benefits derived from obtaining the knowledge of others. Occasionally there will be found members of the group that decline to participate in such movements. They may feel that the movement is not worth while or perhaps that they are bound to benefit from the movement whether they contribute or not and consider it a shrewd stroke of business on their part to save the money and thus benefit at the expense of their co-workers.

The only remedy by which to correct such a situation is the right kind of missionary work on the part of friends and associates. No man is wholly selfish, narrow or bigoted in his viewpoint. It remains only to find ways and means of "getting under his hide"; moral suasion is better than a big stick in cases of this kind.

Opportunity Knocks at the Door of Denver Contractor-Dealers

ON another page of this issue there appears a story of the arrangements made in Denver, Colo., whereby customers of the Public Service Company of Colorado may pay their monthly service bills at electrical dealers' stores. This system affords a real opportunity for the contractor-dealers of Denver to make frequent contacts with users of electricity near their particular stores. This monthly visit of consumers to their stores should be the occasion for the dealer to display his wares to very good advantage. The real value to be received depends on the dealer; its success from his standpoint as well as that of the power company rests in his hands.

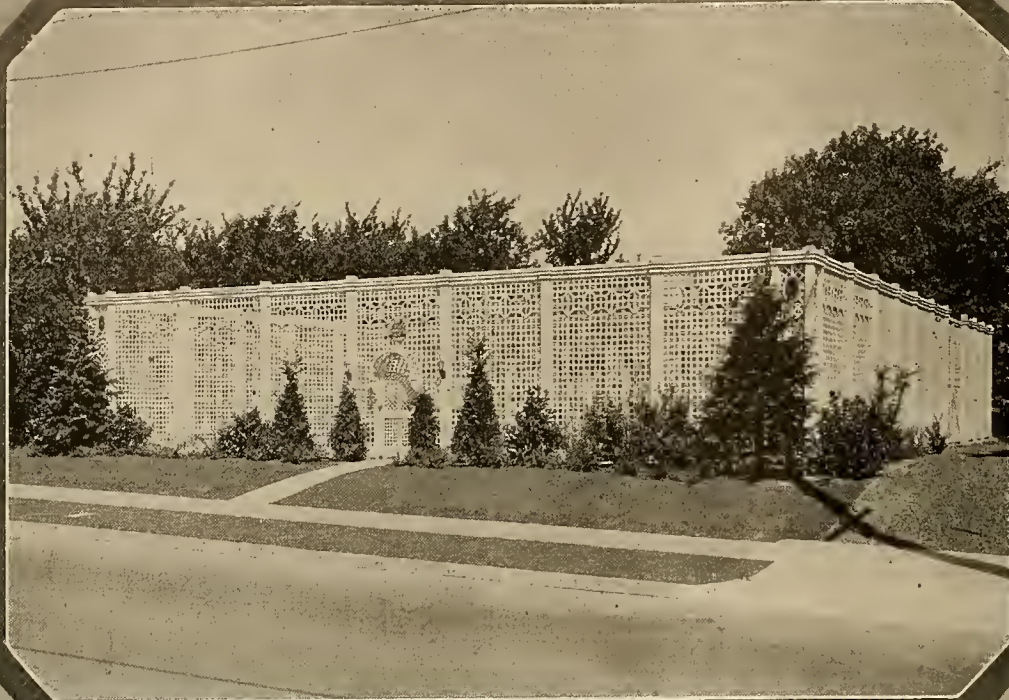
Air Mail Deserves Patronage of Industry

MEANS of speedy communication are vital to the business world, and the recent installation of air mail service is the most useful and important measure of postal improvement since the adoption of the railway postal car system in the sixties.

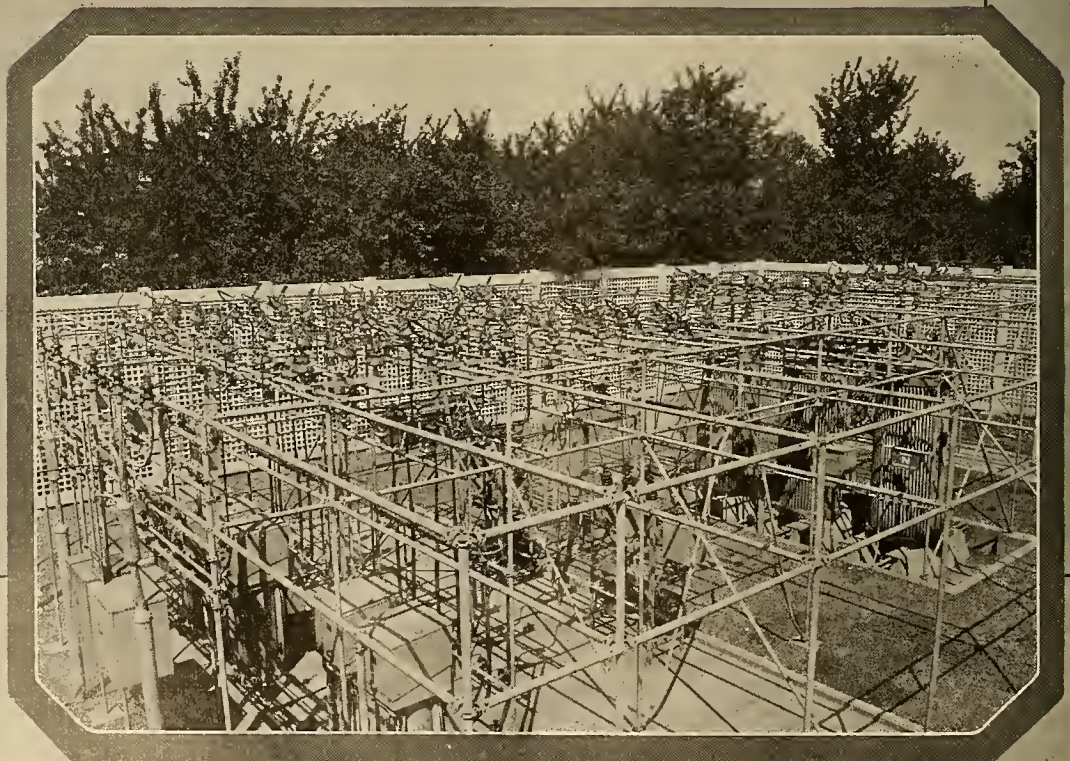
The effect of the new air mail routes upon the postal service of the country as a whole should therefore be clearly understood by the business world.

Transmission of mails by air is effected in less than one-half the time required by train. Air mail letters dispatched from San Francisco today about 9 p.m. are delivered at their address in New York by first carrier day after tomorrow morning; or if forwarded from New York by train to other points, will move by the first morning train instead of by a late evening train. The delivery of such letters in postal territory served from New York will thus be expedited by at least thirty-six hours or more.

In many transactions time is of much importance. The air mail service is of great value in all such cases. It supplies a very desirable facility, especially beneficial to business men and should be used by them for letters, the speediest possible delivery of which is desired. In the case of such letters, the extra postage charge is negligible.



HAWTHORNE SUBSTATION of the Northwestern Electric Company of Portland, Ore. This company is developing a unit-type distribution system which calls for the establishment of a number of substations throughout the residential districts. Notwithstanding the fact that these new substations mean better service to those near by, many potential neighbors in chosen substation localities have protested vigorously against having anything of this nature brought into the neighborhood. In an effort to overcome this unwarranted antagonism the company has adopted the design here shown for use in residential areas. All circuits are handled in underground cables. The lattice completely hides all equipment and the net result is entirely pleasing.



Coolie Wages

By Richard E. Smith

Advertising Manager, Southern California Edison Company, Los Angeles

I HAVE some friends whose principal indoor sport seems to be putting out the lights. When Fred goes in the house and leaves the light in the garage, Helen promptly goes out and turns it off. When Helen comes into the dining room, having left the light in the pantry, Fred is nervous until it is extinguished, and so they follow each other around the house, one turning off the lights which the other forgets.

Being a friend of the family, it was not a social error for me to comment on this one time, to which they replied in unison, much as if they had had several rehearsals, "Our electric bill last month was \$1.55."

Think of it! Their electric bill was \$1.55. No wonder they wear out shoe leather and their rugs to turn out the lights. The trouble with those poor folks is that they have no sense of humor. I use this expression in the English significance where it means a sense of proportion and balance.

This same Fred spends enough for cigars to light all the houses in the block. He tips check girls and waiters far more than he pays the light and power company. A single trip to a second-rate movie show, which he and his wife take as a matter of course, amounts to more than their electric service for the week. Twice a month Helen pays \$1.50 to have her hair "done" and then gives the girl a two-bit tip.

I do not know how much Helen pays for cosmetics, but I imagine this amount would at least compete with the electric bill. If American women realized that the adequate and intelligent use of electric service would make the use of cosmetics largely superfluous, the drug stores would take out their fancy show-cases filled with gold-plated boxes and substitute in their place a line of washing machines, vacuum cleaners and electric irons.

There is one more illustration that I want to use before getting into the main discussion. Not long ago another friend of mine who is a radio "fan" made a mistake one night and connected 90 volts to the 6-volt wire. As a result he burned out all of the tubes in the set and the next day calmly paid \$24 to replace them. Did he raise a great roar? Did he threaten to go to the Railroad Commission? Did he

IN INDIA among the lower classes there is a group called punjabi, who appear to be about as insignificant in the social scale as it is possible to descend, even in India. The punjab does the most menial work for a mere pittance. For example, in a court room or similar place, it is the punjab who stands by with a huge palm leaf, which mechanically he waves up and down throughout the proceedings. For this he receives about two cents daily. COOLIE WAGES. Automobiles never have been accepted in China because ricksha men are cheaper than gasoline. Even so, they are so jealous of their rights that they fiercely combat any effort to introduce modern transportation. Without the opportunity to pull rickshas for a few pennies daily, they feel they would starve to death, little realizing the improved economic condition that arises from substituting mechanical for muscular power. COOLIE WAGES. People who have lived in the Orient are fond of relating the number of servants they had and how little they cost. A whole retinue can be maintained for the cost of a single servant in America. This leads to the theme of this article, "COOLIE WAGES," which demonstrates that in America electricity takes the place of punjabi, ricksha men and all other forms of cheap labor as exploited in the Far East.

get up on a soap box and make a speech about corporations? You know very well that he did not—he thought it was a great joke.

In spite of all the things we tell ourselves about our intelligence and our ability to reason, the human mind runs in ruts. From the above illustrations may be seen two of the ruts in which our thinking machine travels. One is a "cheap" run. This represents the mind at work when it considers some of its needs. Do you remember the great roar that went up during war times when the newspapers raised their monthly subscription rates from 75 cents to 90 cents; when postage was raised from two cents to three cents; when Coca Cola was in-

creased from five cents to six cents, and electric rates made a slight advance? We kicked about these four items whose total effect on our annual budget was about \$8.40 and then calmly went out and paid \$60 for an overcoat which three years earlier would have cost \$18.

The second mental rut might be labeled, "Yes, I know, but we've got to have it." This is the one that explains the complacent expenditure of \$24 for radio tubes.

Unfortunately the electric mind or consciousness of the American people has been steered into the "cheap" rut. Fred and Helen objected to an electric bill of \$1.55, not because such a large amount of money was involved but rather because they are used to getting this service for coolie wages. If an American servant had done all of the things represented by this bill of \$1.55, how much would it have cost? During that particular month electric service in Helen's house had done the washing four times, the ironing four times, had cleaned the rugs eight times, had made toast twenty-six times and coffee sixty times and had supplied abundant light for the house and garage for thirty nights, all for \$1.55. Even the punjabi could not have approached this for real efficiency and economy.

If the American consciousness has acquired the habit of traveling in the "cheap" rut when electricity is discussed, it is largely our own fault, meaning those of us who constitute the electrical industry. We have encouraged our customers to seek methods

of reducing their electric bills. When the tungsten lamp first was introduced, an appliance salesman with more ambition than honesty told his customers, "This new electric lamp has a tungsten element and does not take nearly so much electricity as the old style lamp." He thought he was applying psychology, but he was merely appealing to the "cheap" rut in the customer's mind. Since then gas-filled lamps have been sold promiscuously on the single statement that they reduced the light bill. Many a man has paid the oculist fifty dollars as a penalty for accepting such advice and trying to save a nickel on his electric bill. Beautiful homes on which money has been expended lavishly for rugs, furniture, draperies and general decorations are ruined when dad brings home a handful of 200-watt type C lamps and installs one in each room.

No doubt the Indian gentleman who can induce the punjabi to work overtime without compensation feels that he has done a very shrewd thing. Is not that exactly what we are doing when we try to shave a nickel from the electric bill and deny ourselves a certain amount of comfort and convenience thereby?

One Woman and Her Electric Servant

On the other hand, we occasionally run across a mind that is running in the other groove. I recall meeting a lady who said, "My electric bill last month was \$12 and I hope it will never be any less." No doubt I raised my eyebrows, for she hastened to add, "I never do a stroke of work if it is possible to have my electric servant do it. We burn lights all over the house, in cellar, closets, basement. Maybe it does cost a few cents more, but we get things done quickly without bumping our heads and skinning our shins in dark corners. I am not going to work for two or three cents an hour at manual labor. My time is worth more than that to my husband, my children and my friends. I know that the electric water heater costs money, but is it not worth it to have abundant hot water at any hour of the day or night without a second's wait? Electric service for the refrigerator costs \$35 or \$40 a year, but I would not go back to the ice man for twice that amount."

This last sentiment is especially apropos at the present time, considering the amount of interest being taken in electrical refrigeration. I doubt if there has been a single conference when some new subject like electric cooking or electric refrigeration was being discussed that someone in the crowd did not remark, "Yes, but isn't it pretty expensive?" It is this pessimistic attitude about our own wares that is to blame for most of the trouble. Where an automobile manufacturer meets competition by improving his product and raising the price, your electrical man seeks some way of getting the job by making it cheaper.

Here we have in America, working for coolie wages, an institution which is the greatest factor in our daily lives and also the least expensive. Of all the items in the monthly household budget the electric bill is the least. We pay more for newspapers which we throw away after a glance than we do for the myraid of services rendered through the electric meter. We cannot get the public mind out of this

"cheap" rut until we remove the composite mind of the electrical industry from the same channel.

Returning to the subject of electrical refrigeration, how many men are there in the industry who honestly can say that they exclaimed, "Gee, that's cheap!" when told that one of these machines could be sold for \$300. You know perfectly well that they did not say anything of the sort. On the contrary, they raised both hands and remarked, "Well, you never can get anyone to pay \$300 for that outfit!" How many Steinways, Packards and Radiolas would have been sold if the public had been approached from such a standpoint?

An Electric Refrigerator Sales Talk

The way to handle this situation is to invite a prospect to sit across the desk from you and then say, "Now, Mrs. Brown, I've got a fairy story to tell you. I have here a magic touchstone which you may own. With this you will never be bothered by the ice man again. You will never be interrupted while entertaining friends. You will never have the baby awakened by the crash of ice on the screened porch floor. There will be no more dirty tracks on the sidewalk. You will never have sour milk on Sunday night because the ice man forgot to come on Saturday. You will never have to mop up the floor because someone forgot to empty the pan. You will never have to hang out the card telling the whole neighborhood that you are short of ice. If you wish to leave the house you will not have to leave the back door unlocked for the ice man. In fact, with this touchstone one of the problems of housekeeping will be solved permanently. You will have to make an initial investment but after that the cost will be no more than you have been paying for the old-fashioned unsatisfactory service. You can have this modern miracle for about half the price of a Ford car."

Will she be insulted? Will she get angry and run away? No indeed! She may not hand over \$300 before leaving your store, but you can count on one sure thing and that is that she will go home and make life miserable for Daddy Brown until the question is settled.

The Wrong Viewpoint

The reason more electric refrigerators are not sold is that the electrical man does not handle the situation as suggested above. No indeed! He says, "Well, I tell you. That outfit is all right, but you know it costs \$300. If you wait about six months they will probably bring out another design that you can get for less."

Don't you see how wrong this is? The customer did not come to your store to save money. She comes to spend money. If she wanted to save money, she would have stayed at home and you would never have known about it. The mere fact that she has shown any degree of interest means that she wants what you have if you will only go half way and let her have it.

The whole scheme of electrical merchandising "got off on the wrong foot." In the early days we used slow-burning wire and fastened it on the joints with

wooden cleats. When rubber-covered wire and porcelain tubes were introduced we were horrified at the increased price made necessary thereby. Electrical men all over the country fought the introduction of conduit ordinances, for they knew that their business would be ruined. The man who has sold cord pendants for 65 cents cannot understand how anyone may be willing to spend \$65 for a chandelier. Many a man who would have spent \$150 to get a good job of wiring in his bungalow has had an electrical contractor come along and argue that all these gimcracks are unnecessary and \$50 is all he needs to pay to get the house wired.

The man who thinks in the "cheap" rut sooner or later comes to grief. If he is satisfied with razorback hogs, soon he will give way to his intelligent competitor who appreciates the value of thoroughbreds. If he is an orchardist who is complacent with seedling trees, later he must bow to the man with budded stock. If he is a ricksha man fighting against fate and satisfied with coolie wages, some day he will retire in favor of an automobile.

Great things are expected from the Red Seal campaign. It is a step in the right direction, and if we can get the electrical mind out of the "cheap" rut it will be successful. On the other hand, unless we do something of the sort it will have hard sledding.

The fundamental thought that we must get into our heads is that the customer does not buy three-way switches, convenience outlets, inch-and-a-quarter conduit and other technical things. He is after just the one thing, namely, comfort and convenience as supplied by electricity. He is building a home and he wants it right. He expects things in it which were missing in his father's home. He may not understand the convenience outlet, but if you tell him that he should have it, he will accept your judgment. The house will cost him more than his father paid thirty years ago, but he also expects that. He is making more money than his father did and he is willing to spend it. Why then, in the name of common sense, do we try to give him a job based on the traditions of 1900 when wooden cleats and cord pendants represented the acme of our art? Joshua made the sun stand still, but he was unique and has no modern counterpart. The world will not stop for the modern business man, and he must get into the procession or else stand by and let others pass.

The punjab waves a palm leaf for two cents a day and the ricksha man trots around with his burden while we smile. "The poor fellow doesn't know any better," we say—and then we look over the blueprints and tell the customer, "Well, this is going to be pretty expensive. If you will take out this set of switches and some of these convenience outlets, we can do the job for \$65."

Emerson said, "Hitch your wagon to a star," and someone else remarked, "Not failure, but low aim is crime." If we are to get out of the class of pushcart peddlers and enter the field of merchandising service, we first must get a wider perspective of our possibilities and a greater appreciation of the economic value of our service. When Helen and Fred complain that their electric bill is \$1.55, we should

say, "Come down to the store tomorrow and I will sell you some things which will raise it to \$3, and you will thank me for doing it."

Advertising for a \$5,000,000 Electric Sales Campaign

By J. CHARLES JORDAN, Manager Publicity Department
Pacific Gas and Electric Company, San Francisco

AS a milepost marks a definite point on a road, so the aggressive sales campaign planned by the Pacific Gas and Electric Company in co-operation with other power companies, manufacturers, jobbers, contractors and dealers throughout northern and central California may be regarded as a milepost of progress on the road of electrical merchandising.

The drive, which is in addition to sales plans for the year involving a budget expenditure of half a million dollars, involves two major premises. The company will not sell lamp-socket appliances directly. It will encourage the sale of these appliances through the dealers. Direct sales efforts in cooperation with other branches of the industry will be confined to appliances consuming large wattage.

More than two hundred salesmen and sales engineers will be utilized. A bogie of 4,000 electric ranges representing an installed investment of \$800,000 and 2,000 electric water heaters representing \$200,000 installed has been set. In addition the sale of industrial heating appliances, electric trucks, refrigerators, domestic and commercial lighting will be sold intensively by a corps of trained men in each line. The program calls for the sale of 20,000 kitchen lighting units in five months. The first month's sales indicate that over 30,000 will be sold.

In the success of an undertaking of such importance advertising will play a prominent part. The present schedule, which is being augmented continually by co-operation from sources heretofore inactive, gives every evidence that the campaign will be an event extraordinary in the annals of electrical merchandising.

The Pacific Gas and Electric Company will run display advertising in 232 daily and weekly newspapers, using some 30,000 column inches of space, to emphasize the advantages of the increased use of things electrical. As a tie-in some 650,000 pieces of direct-mail literature will be used.

In operating the kitchen lighting plan a three-column, twelve-inch display advertisement will be published in the newspaper circulating in and about the district, in which the sales crew will work the week following the appearance of the advertisement. Three days prior to the salesman's call each lighting consumer in the district will receive a broadside. These broadsides will be deposited in the mail so as to tie in with the salesman's calls. After the territory has been covered a second call will be made, and prior to this call a sales letter will be sent. In this letter the sales made on the first call will be used as the basic sales argument.

Electric-range, water-heater and space-heating advertisements will be published in all the newspapers as above enumerated. Simultaneously these adver-

Central Station Merchandising—A Study of the Programs of Western Companies

DOMESTIC electric appliances with a value in excess of \$8,000,000 will be sold by the power companies of the eleven Western states to their residential consumers during 1925. This volume, representing approximately \$4 per domestic consumer, is slightly less than one-third the total amount of appliances which consumers in this territory will purchase during the year. These facts are brought out in a study of the merchandising activities of the Western power companies for the first eight months of 1925. In this study returns were received from companies representing 85 per cent of the installed capacity of the region. The appliances include everything from Mazda lamps and curling irons to electric ranges.

During the year central-station commercial departments will dispose of the following appliances:

Electric ranges.....	\$5,000,000
Electric water heaters.....	275,000
Air heaters (all sizes).....	155,000
Electric refrigerators.....	150,000
Washing machines.....	850,000
Vacuum cleaners.....	300,000
Irons	150,000
Ironing machines.....	75,000
Table appliances.....	240,000
Kitchen lighting units.....	375,000
Miscellaneous appliances.....	50,000
Mazda lamps.....	400,000
Total.....	\$8,020,000

Of the \$16,000,000 to be spent by consumers for appliances bought from electrical dealers or from non-electrical outlets, the major portion will go for such devices as washing machines, vacuum cleaners, irons, table and miscellaneous appliances. This is true because practically all range business is done by the central stations on whose programs the electric range is the major item. This holds particularly for California where few companies during 1925 are merchandising any domestic appliances other than the electric range and water heater.

The excellent showings of many of the companies which are merchandising a complete line of appliances, especially those whose average annual sales per residential consumer are from \$15 to \$17, are off-

DURING 1925 the power companies of the eleven Western states will sell appliances valued at \$8,000,000 to their domestic consumers. This represents one-third of the total appliance volume for this region. The major item on the program is 25,000 electric ranges, valued at approximately \$5,000,000. In this article the merchandising programs of the major Western companies are reviewed and the policies followed in various districts discussed.

set materially by the showing of those companies which merchandise ranges only. Because of this policy, the average appliance sale per consumer for all companies in the region is exceedingly low in comparison—\$4 as against \$12 to \$17. However, this average will be increased materially as a result of the aggressive campaigns announced by some of the California companies featuring ranges, water heaters, refrigerators and air heaters. It is believed that records as good as those of companies

in the Northwest and Intermountain states could be achieved by those California companies which at the present time are devoting sales efforts only to the major appliances.

Table I shows the appliance sales by companies in the territory for the first eight months of the present year. The number of ranges is approximately 15,000 and water heaters 4,000. The annual quotas for these items as set up by the individual companies calls for the sale of 25,000 ranges and 7,000 water heaters, a record which in all probability will be exceeded. Some might consider the showing in the sale of electric refrigerators disappointing, as only three companies have devoted any efforts to the sale of this appliance so far this year. This situation will be remedied in 1926, however, when practically all companies will be pushing domestic refrigeration actively.

The rapid rise of the better-lighted kitchen movement is shown by the table. Nearly 40,000 lighting units have been sold so far this year, despite the fact that two major companies have yet to stage their annual campaigns.

Periodic Campaigns Featuring Specific Appliances

Practically all central stations that actively are merchandising engage in periodic seasonal sales activities featuring certain appliances, in addition to Christmas and June Bride campaigns. Ranges, refrigerators, washing machines, ironers, vacuum cleaners and kitchen lighting units receive the major amount of attention in such campaigns but percolators, irons, toasters and other devices frequently are featured.

The usual practice in such campaign is either to

**TABLE I—MERCHANDISING ACTIVITIES OF WESTERN POWER COMPANIES
FOR FIRST EIGHT MONTHS OF 1925**

COMPANY	Per Cent of Total Installed Capacity in Western States	No. of Stores Offices Displaying Appliances	Ranges	Water Heaters	Air Heaters (1 kw. up)	Air Heaters (Less than 1 kw.)	Refrigerators	Washing Machines	Vacuum Cleaners	Irons	Ironing Machines	Table Appliances	Kitchen Lighting Units	Mazda Lamps	Miscellaneous
Calif. A.....	1.31	6	370	*	*	*	*	*	*	*	*	*	*	*	*
Calif. B.....	14.92	25	1,793	716	979	*	*	*	*	*	80	*	7,000	280,000	*
Calif. C.....	5.23	10	1,000	400	500	*	*	*	*	*	*	*	500	*	*
Calif. D.....	1.17	4	28	15	*	*	*	*	*	*	*	*	*	*	*
Calif. E.....	4.54	2	636	369	26	74	37	25	198	688	6	1,668	*	43,783	3,686
Calif. F.....	14.05	50	756	398	*	385	*	*	*	5,300	*	1,504	15,516	261,000	682
Calif. G.....	1.01	5	171	72	*	*	*	*	*	*	*	4	3,650	*	*
Calif. H.....	2.70	17	94	24	7	8	*	*	1	121	*	105	*	*	90
Ore. A.....	3.73	4	1408	201	286	403	†	153	149	668	58	848	2,973	76,550	†
Ore. B.....	0.91	20	281	217	†	36	23	184	460	910	26	581	1,408	15,975	380
Ore. C.....	1.30	3	959	125	28	11	5	†	†	†	1	†	550	†	†
Wash. A.....	4.12	25	908	824	†	49	86	55	359	847	68	991	3,252	†	†
Wash. B.....	4.09	29	4500	†	†	†	†	†	†	†	†	†	†	†	†
Wash. C.....	1.00	1	330	28	*	*	*	*	*	*	*	*	*	30,147	*
Idaho A.....	1.84	21	697	419	43	†	17	626	181	774	46	740	3,570	45,725	779
Mont. A.....	6.88	20	573	57	350	†	†	376	371	972	55	841	†	†	†
Utah A.....	5.13	31	729	64	95	†	69	1,309	314	2,035	64	646	2,389	90,329	322
Nev. A.....		1	*	*	*	35	*	*	37	114	*	96	†	†	†
Colo. A.....	2.89	14	131	12	25	272	173	1,024	722	3,592	143	1,224	465	244,100	1,302
Colo. B.....	0.85	7	282	18	*	*	28	97	65	766	19	343	72	38,287	2,300
B. C. A.....	3.21	7	238	167	8	65	†	285	310	821	21	435	46	20,000	1,200

*Will not merchandise this appliance in 1925.

†No record.

feature a special price or unusually advantageous terms in the case of the major appliances. Where price concessions are made it is customary to allow dealers to participate in the campaign on the same basis as the central station. Where long terms are offered, the power company in the majority of in-

stances carries the paper for appliances sold by dealers. Special advertising, both newspaper and direct-mail, is employed in arousing consumer interest in the appliance featured.

An idea of the type and scope of these campaigns can be gained from Table II, which shows the seas-

Table II—Seasonal Merchandising Campaigns

MONTH	Utah Power & Light Company	Public Service Co. of Colorado	Washington Water Power Company	B. C. Electric Railway Company	San Joaquin Light & Power Corp.	Southern Colorado Power Company
January	Clean-up					
February	Ironers	Lamps and Fixtures	Kitchen Light'g Units		Vacuum Cleaners	Small Appliances
March	Washing Machines	Vacuum Cleaners	Ironers		Vacuum Cleaners	Small Appliances
April	Kitchen Light'g Units	Washers, Irons	Ranges		Percolators	Vacuum Cleaners
May	Ranges and Refrigerators	Ironing Machines	Ranges		Percolators	Vacuum Cleaners
June	Ranges and Refrigerators	Refrigerators	Ranges	Ranges, Vacuum Cleaners	June Bride Fans, Cookers	June Bride Washers
July	Ranges and Refrigerators	Refrigerators, Irons	Ranges		June Bride Refrigerators	Washers
August	Ranges and Refrigerators	Refrigerators	Irons	Irons	Fans Refrigerators Cookers	Ranges
September	Ranges and Percolators	Refrigerators	Commercial Lighting Units	Ranges Washers	Vacuum Cleaners	Ranges
October	Washers and Ironers	Vacuum Cleaners	Air Heaters, Commercial Lighting Units	Vacuum Cleaners	Toasters Vacuum Cleaners	Vacuum Cleaners
November	Ranges		Washers, Ironers		Toasters Waffle Irons	Christmas Gifts
December	Christmas Gifts	Christmas Gifts			Waffle Irons Air Heaters Christmas Gifts	Christmas Gifts

onal merchandising activities of some of the power companies. Excellent sales records have been established in some of the campaigns conducted in this manner. Companies have sold as many as 15,000 kitchen lighting units, 2,000 electric cookers, 800 ranges, and 750 washing machines in individual campaigns.

Compensation of Salesman

The average number of salesmen employed varies with the companies, ranging from three in the case of those which are engaged only in the sale of electric ranges, up to 300 in the case of the Pacific Gas and Electric Company, which is engaged in an active load-building campaign of major proportions. For the twenty-two companies reporting in this survey the total number of salesmen employed is in excess of 600.

Most companies compensate salesmen on a salary-and-commission basis, although many employ them on straight salary. Opinion is divided as to which of these methods is the more satisfactory. The policy of employing salesmen on a straight commission basis is falling into the discard on account of the unsatisfactory type of salesmen recruited for this type of work. Some companies, however, still compensate outside men on the basis of straight commission, the practice being to give a guarantee of \$75-\$100 with a 10 or 12 per cent commission.

House-to-house salesmen are employed largely on

ranges, kitchen lighting units, and in the special campaigns on the appliances featured at that particular time.

Average Sales per Residential Consumer

The average annual merchandise sales per residential consumer in the case of companies handling a complete line of appliances from ranges to curling irons vary between \$8 and \$17, with the companies doing approximately 60 per cent of the total electrical merchandise business in the territory served.

TABLE III—Average Annual Merchandise Sales per Residential Consumer.

COMPANY	Average Sales per Consumer	Estimated Volume of Power Company (Per Cent)
Montana Power Co.....	\$ 5.95	75
Pacific Power & Light Co.....	8.27	40
Idaho Power Co.....	17.00	60
Utah Power & Light Co.....	10.85	75
Public Service Company of Colorado....	13.68	60
The Washington Water Power Co.....	12.00	60
San Joaquin Light & Power Corp.....	15.00	50
B. C. Electric Railway Co.....	3.30	50
Southern Colorado Power Co.....	16.00	40

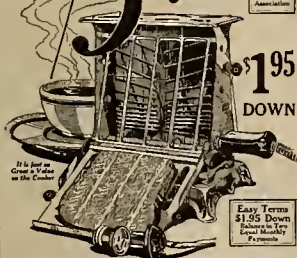
In cases where companies only merchandise ranges, water heaters and air heaters the average sale per consumer is approximately \$4, with the power company doing less than 25 per cent of the business in the

Think of This! A Giant Turnover ELECTRIC TOASTER

for only

3.95

Approved by
the
National
Bakers'
Association



**\$1.95
DOWN**

Easy Terms
\$1.95 Down
Balance in 12
Equal Monthly
Payments

You have always wanted a good Electric Toaster. Here it is at only half what you expected to pay.

Delicious, Crispy Brown Electric Toast. Takes the Largest Size Slice of Bread.



Sale Starts Monday September 14th

2 for \$3

Thor Electric Washer — and — Thor Electric Ironer

Both for **\$3**

Down—in Our Combination Offer

When you use one, you'll want the other. Use them together and know the joy of a CRUDGELESS washing and ironing day.

SPECIAL DISPLAY IN OUR SHOWROOMS

If We Had Marked Time
You'd find it hard to believe that these two great appliances are now available for only \$3 each. But that's the fact. The Thor Electric Washer and Ironer are now available for only \$3 each. This is a great bargain.

Public Service Company
OF COLORADO.

SERVE BOUNTIFUL BREAKFASTS THIS WINTER

Appetites begin to demand larger breakfasts at this time of year. School children especially should have a satisfying breakfast to start their day.

Breakfasts taste better when cooked at the table, everything served piping hot, from Electrical Appliances.

GRILLS PERCOLATORS TOASTERS WAFFLE IRONS
\$12.50 \$18.00 \$4.95 \$15.00

SOUTHERN COLORADO POWER CO.

Why Not Cook at the Table, Then Take Your Exercise Out-of-Doors

News Item—
"The distance traveled by the American housewife in her daily tasks varies from two and one-half to fifteen miles a day, according to the following measurement noted and the arrangement of her kitchen."

The miles you walk in your kitchen could be better spent walking in the open air. Every electrical appliance you use cut down indoor miles. Cook as many meals as possible at the table and save time and energy for more enjoyable outdoor exercise.

You Need a Grill—Toaster—Percolator

We herewith extend a sincere welcome to THE PACIFIC STATES ELECTRIC COMPANY upon the establishment of their San Diego branch.

SAN DIEGO CONSOLIDATED GAS & ELECTRIC COMPANY
Main 64 857 Sixth St.

Do You Stand on a Chair

every time you connect your toaster, iron or cleaner?

Do you move the washing machine every time you use it because there is no socket near by?

Do you remove a lamp every time you use your sewing machine?

A few CONVENIENCE OUTLETS properly located will stop all this bother. The CONVENIENCE OUTLET is simply a place to use electricity, located at the point of use. There should be at least one in every room.

The cost of Convenience Outlets is small, particularly when their installation is carefully planned. Any electrical contractor or dealer is prepared to give expert advice.

SOUTHERN CALIFORNIA EDISON COMPANY

GOOD COFFEE

—adds the finishing touch to any meal

The ELECTRIC PERCOLATOR is the best medium for securing it.

We have found a percolator that is so convenient that the owner will not hesitate to use it every morning before coffee is served, and it is now offering you for a limited time at a price which makes for itself. We recommend and guarantee the percolator and assure you that it is a great bargain.

SPECIAL PRICE "Cash and Carry"

\$3.75

DESCRIPTION
THIS IS A DURABLE ALUMINUM PERCOLATOR, 4-CUP SIZE, WITH LOW-LAZE HANDLE, COMPLETE WITH COFFEE BASKET AND COFFEE READY TO USE.

What you must do to get one:
1. Call at our office 2. Pay cash—\$3.75
2. Select a percolator 4. Carry it home

Think of getting an electric percolator for the price of a plain coffee pot! Only by combining with these times can you get one!

SOUTHERN CALIFORNIA EDISON COMPANY

For a Limited Time Only We Will Allow You \$1.00 for Your Old Iron

ON The American Beauty

One of the best ever made

We give you \$1 for your old iron, no matter what kind it was—Electric, Hand-Operated or Hot Plate. Three special terms give you the \$1.00 "American Beauty" for \$1.00—with the extra advantage of our credit.

Don't Delay—Get Yours Today

Four call and get your iron on phone or find one in store to be delivered to your home.

MADE 4000

Public Service Company OF COLORADO

Immediate Warmth for Chilly Evenings

FOR ONLY 95c down

You can have the comfort of the marvelous development in gas heating. For a limited time only we will install a Radiant Gas Heater for you.

95c down

Remainder to 12 convenient monthly payments.

Radiant Gas Heaters. It heats by touch as the sun of a starburst of heat. In fact, it is the only heater now, without doubt, directly in the room.

We have used and advised of Radiant Gas heaters.

Public Service Company OF COLORADO

An Electric Range in Every Kitchen

—that's what we are eventually coming to

Daily Demonstrations
 From 1:30 to 4:30 P.M.
 Are Being Made Each
 Day, November 12-15

Don't Fail to See the Demonstration of Electric Cooking by Mrs. Kate Brew Vaughn on

Visit The Homeless Evening Post Cooking School
 At the Woman's Club—
 houses, November
 12th, 14th, 16th
 Thursday is the last day

The Westinghouse Automatic Electric Range

Come in and inspect this range at your leisure. Learn what electricity can do for you in your kitchen. Even if you do not plan to buy a new range at this time, it will pay you to investigate this marvelous device.

We can fit your needs—and at reasonable prices. We now have especially low combination lighting and cooking rates.

At the Woman's Club—houses by the Famous Cooking Experts, Mrs. Kate Brew Vaughn

Southern California Edison
MONROVIA

The Odorless Refrigerator

Electric refrigeration does away with the disagreeable "ice-box" odors. Because the air is cold and dry, there is no staling of food odors. MCH and butter will not absorb the odor of cheese, fruit or meat. No ill-humors, spoil and muddle with this perfect process of refrigeration.

Electric refrigeration can be installed in your present kitchen. Operates for no more than the cost of ice.

Public Service Company

The Model Housewife—The Successful Hostess—

How the electric range makes the electric refrigerator the perfect management of her home.

Public Service Company OF COLORADO

The Best in Electric Refrigeration

Frigidaire! Kelvinator! Serv-El!

We have Electric Refrigerators to supply for every home, the long-range as well as the medium-range. Because the air in the Electric Refrigerator is dry and colder than ice, it preserves foods longer and better. Besides, this modern wonder will make crystal ice cubes for table-top-ice drinks, iced tea and frozen coffee.

Let us quote you in more advantage. Write, post 10 cents, to: Home Appliance Department, 1000 Broadway, New York, N.Y. We will send you the full story of the electric refrigerator in the most interesting way. You can keep it and pay for it as you want.

Public Service Company
Main 4000 OF COLORADO

Now! ICE BY WIRE

ELECTRIC REFRIGERATION is now available for the average as well as the mansion. And the operating cost is only a few cents a day.

It provides cold, dry and sanitary refrigeration—sanitary, because it destroys germs and even temperature variations in four hours of the day. In addition, it has facilities for freezing ice cubes for iced tea-making, sherberts, ices, frappes and salads without effort.

This all-year-around convenience can be installed in old homes, new homes, apartments, restaurants and markets.

Public Service Company of Colorado

Modernize Your Kitchen

Many homeowners in Pueblo are learning these days that the way to enjoy real kitchen comfort is to cook electrically.

They there will be no smoke and need to disfigure walls and ceilings—no scorching of pots and pans. All the heat is directed against the cooking instead of a big, cold, economical method.

The Electric Ranges

which we are displaying, embodies the latest principles of mechanical and electrical construction. They are built for service.

Let Us Demonstrate Its Advantages.

SOUTHERN COLORADO POWER COMPANY

ICE BY WIRE

If you spent 60 days straight at the kitchen stove

—you'd see why it is that nearly eighteen hundred homes within reach of the Copco lines are now using electric ranges.

Two hours a day, every day in the year, is probably a low estimate of a housewife's time in the kitchen. Sixty full days, in all—and they're worth making easier!

Electrical cooking is faster, and cleaner. It puts an end to dirt and ashes. It means less sweeping of floors, less cleaning of walls, cleaner attire.

Electrical cooking is tastier, Uniform, controllable heat saves the flavor of dairy foods.

Electrical cooking is economical—surprisingly so. The average cost of electricity for cooking is only about twice the cost of the electric lighting current in the same home. (Actual average figures for your own neighborhood will be shown you upon request.)

Don't pass the next display of electric ranges without just dropping in and asking your dealer more about them—and about the convenient payment terms he is offering.

THE CALIFORNIA OREGON POWER COMPANY

Samples of successful electric range and refrigerator newspaper advertising used by Western power companies during the current year.

territory. Previous studies conducted by the Journal of Electricity (April 15, 1924, p. 279, and Oct. 15, 1924, p. 271) and Electrical World (April 26, 1924, p. 822) show that in communities where the central station is merchandising actively, the strictly electrical dealer is doing relatively larger business than the dealers in communities where non-electrical outlets are doing the volume of business which otherwise would be done by the power company.

Figures showing the average annual merchandise sales and the estimated percentage of the total electrical business done by the central station in its territory are shown in Table III.

Electric Range Merchandising

Excellent records have been established this year by Western power companies in the sale of electric ranges. Total sales for the first eight months of the year approximated 15,000 ranges with a total quota for the year of approximately 25,000, with every likelihood of the quota being exceeded. The most spectacular record has been made by the Puget Sound Power & Light Company which has added 4,500 ranges to its lines during the year and expects to add 6,000 before the end of 1925, or an increase for the year of 100 per cent in the total number of electric-cooking consumers. The Pacific Gas and Electric Company, with its quota of 6,000 ranges established Aug. 1, 1925, gives every promise of reaching the goal set for the end of the year.

Two six-week campaigns were staged by The Washington Water Power Company with considerable success. In the first, 375 Hotpoint ranges installed complete with water heaters were sold on the basis of \$9.75 down and the balance over a period of 24 months. In the second, 469 Westinghouse ranges were sold on the basis of \$4 down. The Montana Power Company sells ranges, installed, at its cost plus 10 per cent, with a small down payment and long terms. During its range campaigns the Northwestern Electric Company reduces the initial payment from \$30 to \$15 and gives the consumer a premium of from \$15 to \$20 on the retail value of the range.

The California Oregon Power Company does not sell ranges directly to its consumers, but co-operates with electrical dealers in their sale. Considerable success was achieved in a campaign during the summer that is described on another page of this issue. For details regarding the ranges sales activity of the Pacific Gas and Electric Company and Great Western Power Company see Journal of Electricity, July 1, 1925, p. 33, and Aug. 1, 1925, p. 106.

Electric Refrigeration

Little progress has been made in the development of domestic electric refrigeration this year, but practically every power company has announced that this business will be a major commercial department activity in 1926. The Public Service Company of

Colorado sold approximately 200 refrigerators during the summer months as a result of a special campaign which featured a 30-day free trial offer. Only the high-class residential section of Denver was canvassed on this basis, and but few refrigerators installed on a trial basis were removed.

The Utah Power & Light Company met with considerable success in its initial refrigeration sales efforts and is planning for an intensive campaign next year. The Washington Water Power Company also did some pioneer sales work in this field, using the 30-day free trial plan. As stated before, nearly every major company plans intensive refrigeration sales work next year, and the industry is confident that the record made in the sales of electric ranges by the Western central stations will be equaled in this new domestic load-building field.

Trade Policy Regarding Dealer Co-operation

Dealer co-operation has been developed to a high degree by the Western central stations, especially in California. Where co-operative leagues have been organized, the power companies are the chief contributors to these organizations. In other districts the companies are leading the way and setting the pace for the remainder of the industry in merchandising appliances.

In practically all districts when special campaigns are engaged in, the dealers are given the opportunity to participate in these campaigns on the same basis as the power company. In nearly all cases the major amount of appliance advertising is being done by the power companies. Special financial assistance is rendered the dealers in many districts, the power company carrying the dealer's term-payment paper on the larger appliances.

In California practically all small appliance business is left to the dealer and the non-electrical outlets. The recently announced load-building campaigns in this state, together with the special efforts which are being made to enlist the support and co-operation of the dealers, are doing much to improve the relationship between the various branches of the industry as well as the non-electrical outlets.

Except in cases of special campaigns, the majority of the companies merchandising maintain list prices.

Many unique ideas in the way of dealer co-operation have been developed. For instance, the British Columbia Electric Railway Company, Ltd., allows the dealers a special rate of 2 cents per kw-hr. for all energy used in the demonstration of appliances. Several companies allow dealers to use district offices for the display of appliances. Others place range demonstrators at the disposal of dealers desiring to demonstrate ranges in their stores. The San Joaquin Light & Power Corporation has placed the services of a member of its engineering department at the disposal of contractors in an advisory capacity for making up specifications and laying out electrical plans for new buildings.

The Northwestern Electric Company allows dealers a 15 per cent commission on all range sales made by them, the company carrying the term paper. This company also places ranges on consignment in the stores of dealers displaying appliances.

The California Oregon Power Company sells no appliances of any character. However, it does use its purchasing power in buying electric ranges in car-load lots for the dealers.

The Southern Colorado Power Company holds periodical meetings with contractors and dealers for the purpose of keeping them in close touch with its merchandising activities. When special inducements are offered on appliances, dealers are given an opportunity to participate. The company makes the point of not attempting to monopolize trade by handling several makes of any one appliance, confining its activities to appliances of three manufacturers and leaving others for the dealers.

Tying in a Toaster Sale with a Trade-at-Home Campaign

THAT advantage may be taken of matters of community interest and be made to pay in terms of increased good will and commercial profits is evident in the case where a central station consummated a good piece of business in one day by featuring a turn-over toaster demonstration and sale which was tied in with the community's "trade-at-home" campaign.

The city was Boulder, Colo., with a population of 12,000. Boulder is about 30 miles from Denver. Denver dealers have found it profitable to run trucks there daily. Bread is one of the commodities widely handled in that manner. Severe inroads were made on Boulder bakeries. One firm had closed its doors and another had been turned over to its creditors.

For several weeks one of the two daily papers—The News Herald—had been bludgeoning the populace through editorial and news columns to buy and eat only Boulder-made bread. The American Legion post had taken up the campaign. It had been discussed at men's luncheon clubs, women's sewing clubs, and on street corners.

At the height of the agitation the commercial manager of the Public Service Company decided to run a one-day special on toasters, offering them for \$3.50 each, on terms.

"Why not give them fifty cents worth of bread as a premium and specify Boulder-made bread?" suggested the advertising man. "I'll hustle out and see the bakers and arrange with them to accept certificates from us for the bread."

There are four bakeries in the city. All gladly accepted the chance to tie in on the plan. One of them ran an advertisement the night before the sale featuring the toaster. The paper which had been championing the buy-at-home movement was so struck by the idea that its editor devoted his leading editorial to the sale, and did it the evening before the sale took place, at that.

As a result, the toaster stock was gone long before the sun set. The total advertising cost to the Public Service Company was something less than \$10. For that sum it received its own advertisement, a boost by one of the bakeries, and invaluable publicity in the editorial columns.

Spring Test of Electric Ranges in the Northwest*

MARKING a milestone in the investigation of the electric range load, the National Electric Light Association recently has published a report on the results of the spring tests, 1925, conducted in Spokane, Wash., and Boise, Idaho, by the range survey subcommittee of the electric cooking and heating committee of the Commercial National Section. This subcommittee, appointed in the fall of 1923, first occupied itself with determining what data were desirable, and with arranging ways and means to obtain these data. After preliminary meetings had led to an agreement on a program of work, approval was given and money provided for a series of field tests to be carried on during the entire year of 1925 in Spokane and Boise, to reveal certain facts surrounding the serving of small and large groups of ranges. Some of the data to be made available from these tests were: average demand of range, annual kilowatt-hour consumption of range, diversity of range demand, load characteristics of a large group of ranges, 10, 25, 50 or more, diversity between range peak and system peak, and figures on costs of range service, both to the customer and the company; and in addition, similar data with respect to water heaters, small appliance load, and lighting load in its relation to range load were to be compiled.

The subcommittee appointed to work out the adopted program consists of Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane, chairman; M. T. Crawford, superintendent of distribution, central district, Puget Sound Power & Light Company, Seattle; Lester R. Gamble, assistant engineer, The Washington Water Power Company, Spokane; and F. J. Rankin, chief engineer, Idaho Power Company, Boise. Early in the current year this committee proceeded to put the various tests into operation, and though it will be some time before complete results will be available, it compiled the results of such tests as were available at this time into the report referred to above. An abstract of this report, together with extracts from it including some of the charts and curves, is presented herewith.

Perhaps the most interesting and significant find-

OF such timely interest to western utility companies and electrical dealers are the results of the first tests made by the range survey subcommittee in the Northwest that the Journal of Electricity welcomes the opportunity to present its readers with these results afforded by the publication last month of a serial report covering the spring tests in Spokane and Boise.

ing of the committee, as shown in the report, had to do with discovering the average demand of the individual range and the average simultaneous demand of a group of ranges. Certain superficial tests and guesswork had led to a number of different opinions about these demands; as established by tests on seventeen individual ranges over a week's period each, the average demand per range was found to be 3.88 kw. In commenting on these

tests the report states that a greater number of individual range demands would be tested to check this figure, but expressed the belief that these additional tests would not change it greatly.

From the data obtained in these tests, curves, shown in Figs. 3 and 4 of the report, reproduced herewith, were calculated showing the change in kilowatt demand per range as the number of ranges is increased. The significant fact disclosed here is that for a group of over 50 ranges an average demand per range of less than one kilowatt is certain. The report's comment on these curves follows:

The curves marked "Upper Limit" and "Lower Limit" represent those values of maximum and minimum demands as found in combinations made. The curve marked "Average" is then the average of the points determined and not an average on the two limiting curves. In order that the curve on Fig. 3 could be used for a larger number of ranges the curve on Fig. 4 was plotted covering a total of 4,000 ranges. This could be done with a reasonable degree of accuracy by estimating the limits on the diversity curve in Fig. 2. These limits were estimated to be between 5 and 6 for 4,000 ranges. The value of 5.5 was used, thus making the kilowatt demand per range 0.700 for 4,000 ranges. Referring again to Fig. 3, it will be noted that certain points are designated. Point "A," which was determined on the superficial tests made in Spokane tests and reported in Appendix A, is right on the curve. Points "D" and "E," as reported in the Seattle Apartment tests last spring, are also on the curve. Point "G," which was determined on the superficial tests made in Spokane a year ago, falls on the curve. Points "B," "C," and "F," which are demands taken from the Seattle and Boise tests, do not fall on the curve but are within the limits established.

Demands of Different Residential Services

The report then proceeds to a discussion of the tests for simultaneous demands on about 150 ranges, water heaters, small appliance consumers, and lighting consumers, presenting the demand curves of a week's run on each of these different classes of service. Fig. 5 of the report, reproduced herewith, shows the demand curve for 140 ranges, indicating a peak of 122 kw., or 0.871 kw. per range, falling on Wednesday, April 1, between 5:45 and 6 p.m. Slightly

* An abstract of the serial report of the Electric Cooking and Heating Committee, Commercial National Section, N. E. L. A., published August, 1925.

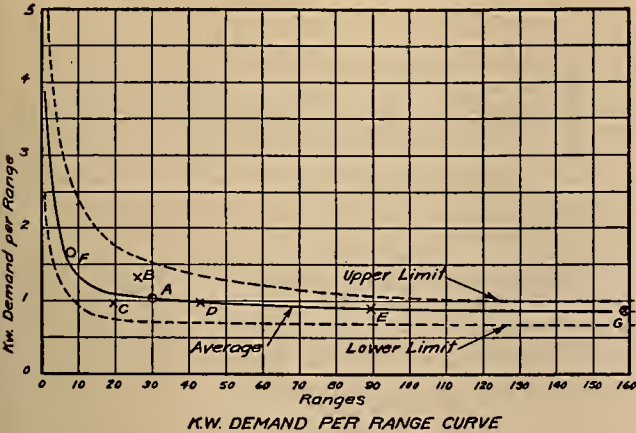


Figure 3.

lower peaks occurred daily except Sunday at about this same time. In another test on 110 ranges a peak demand of 0.95 kw. per range was found. Discussing the two curves the report says:

Both curves are typical range curves showing a morning and noon peak of about equal value but a decided evening peak. The three peaks occur on each day of the week except Sunday where there is but one peak about 1 p.m.

Discussing the water heater test, curve of which is shown in Fig. 7, reproduced, the report explains particular conditions influencing this curve as follows:

The water heater as installed in Spokane is a part of the range service, with the range metered and the water heater on a flat rate. A double-throw switch is provided with this combination so that the range ovens cannot be used when the water heater is in service or vice versa. The effects of this arrangement are clearly shown by the load curve on Fig. 7. For the three range peaks of the day there is a corresponding falling off of water heater demand and with the greater range peaks the smaller becomes the heater demand. These curves show about 76 per cent of the water heater load is on during the range peak.

Tests on the combined range-and-water-heater load of 150 consumers showed curves characteristic of those for range alone, only with higher peaks. A demand of 1.48 kw. per consumer was recorded at 6 p.m. of the peak day of the week of this test. Tests on 100 customers for the demand imposed by lighting and small appliance load indicated a peak of 0.208 kw. per consumer occurring Thursday, April 23, at 8:30 p.m. The report points out that at this season of the year this peak is two hours and forty-five minutes later than the range peak.

A test then was run on the combined load of the 150 consumers the week of April 30 to May 6, as shown in Fig. 10, reproduced, and the report says of this test:

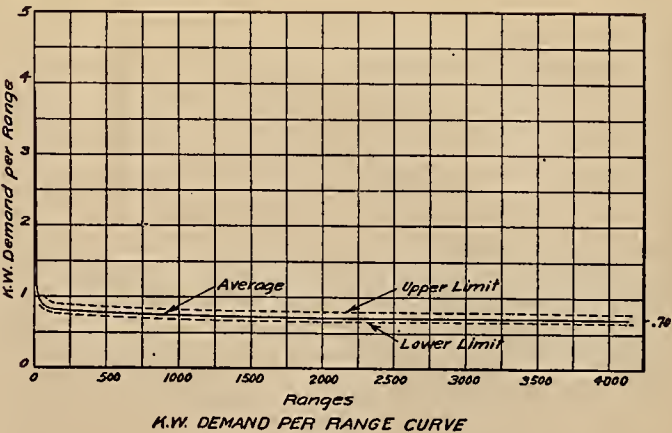


Figure 4.

It is seen that the curve has the same general characteristics as that for the range. There is a slight peak, however, between 8 and 9 p.m. which is due to the lighting load. The peak day was on Friday, the demand occurring at 5:45 p.m. This demand was 225.5 kw. or 1.5 kw. per consumer.

Comparison of Range Demands Among Different Classes

Believing that the similarity in habits of certain classes of consumers influenced by their occupations would have a bearing on their use of the electric range, and that the different habits of different classes would cause a difference in the diversity factor as between classes, the committee then ran tests to show the use of ranges by these classes. The following three divisions were established arbitrarily: industrial—small and medium houses—railroad men; average residential—small and medium houses—miscellaneous; and high-class residential—large houses—business men. To simplify testing, fifteen districts of the city in which a number of similar classes of consumers were concentrated were marked off. Tests were made on 20 small, 20 medium and 20 large residential range consumers, and also on 20 range consumers who were industrial workers. Commenting on the curves resulting from these tests, the report says:

It will be noted that the curves for the different-sized residential consumers all have the same general shape varying only in peak kilowatt demands and kilowatt-hour consumption. The morning and noon peaks are of about the same size and are considerably smaller than the evening peak, which practically always comes during the 15-minute period just before 6 p.m.

The demand curve of the 20 industrial consumers, who are mostly employees in railway shops or railway trainmen, shows a considerable variation from the other type of consumer in that the noon and evening peaks are about equal,

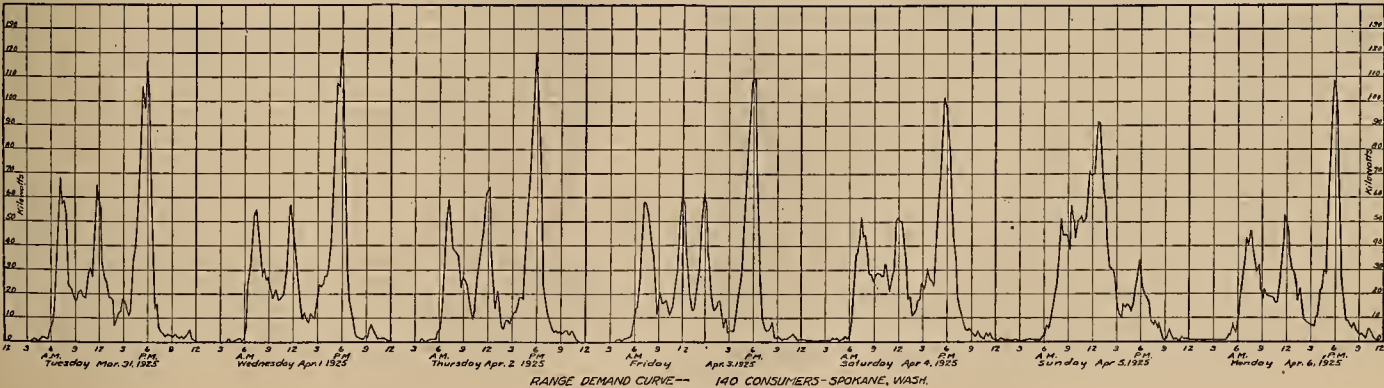


Figure 5.

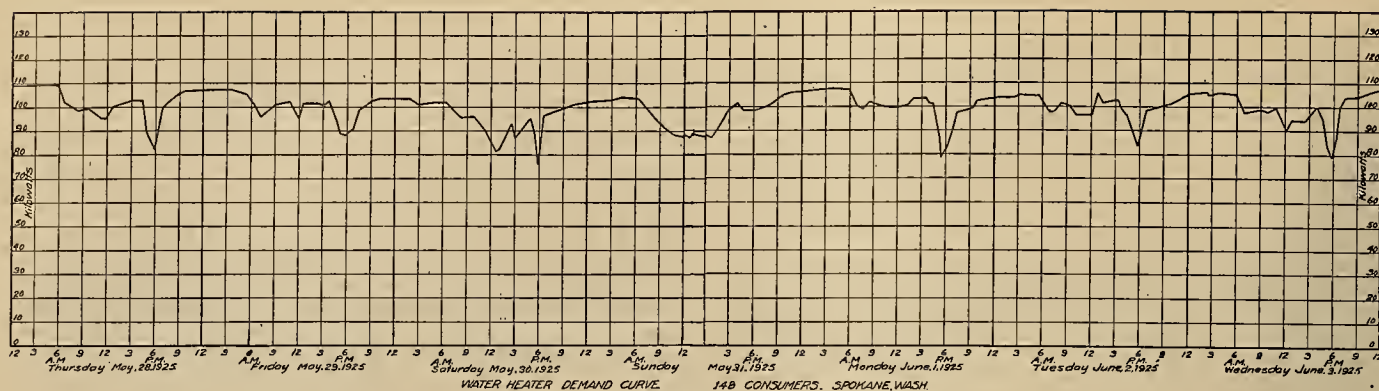


Figure 7.

the noon peak, in most cases, slightly exceeding the evening peak. The large noon peak is undoubtedly due to the fact that most of the heads of families are employed near home and are able to be home for the noon meal and that the time for the noon meal is limited to one definite hour by the nature of their employment. Another very noticeable difference is that there is a very decided peak at six o'clock on Sunday evening which is almost entirely absent from the other curves. This can be explained by the fact that, being railroad men, some of them must work on Sunday the same as on other days and also, being accustomed to two large meals on week days, they eat two meals on Sunday also.

In order to show what part each particular type of service plays in building up the residential load, a chart, upon which was plotted the curves of the different loads on the peak day, Wednesday, April 1, for the 150 consumers, is shown in the report. It emphasizes the decrease in the water-heater demand during the range peak, showing the effect of the double-throw switch on the range and water-heater service.

Effect of Range Load on Lighting Feeder and System Peak

Fig. 15 of the report, reproduced, shows the effect of the range load on the total load of the lighting feeder. Explaining and commenting on this chart, the report says:

On the basis of the tests for 150 ranges the total range, water-heater, and lighting loads of Spokane, Wash., were calculated. The curves of these loads are shown on Fig. 15 for the maximum day, Wednesday, April 1. Again it will be seen that the range load has no effect on the total residential load. The lighting peak occurs about one hour and forty-five minutes later than the range peak during this season of the year, and is so much larger than the range peak that the range load has no effect on the total residential load. In winter when the lighting peak is near six o'clock the range peak will be added to the lighting peak and therefore will determine the total residential load peak demand.

A chart also is shown in the report on which are plotted the curves for April 1 of the Spokane district lighting load, the Spokane district total load, and the total load of the entire system which, of course, includes a considerable load outside of Spokane. The report points out that there is a similarity between the curves of the lighting load and of the total load within the Spokane district, but that no similarity exists between these curves and that of the total system load. It is evident that the numerous types and kinds of load existing outside of Spokane are so much greater and different than the city load that the city load does not control the characteristics of the load curve of the system.

Load Data and Revenue

To round out the results of the Spokane test, two tables of load and revenue data are given. These tables with the comment thereon follow:

Time did not permit making a connected load survey of the districts tested. The range and water-heater data were al-

TABLE I
Load Characteristics of Average Individual Consumer Based on 150 Consumers in Spokane, Wash.

Items	Range	Light and Appliance	Range, Light and Appliance	Water Heater	Total Load
Kw.hr. for week of test.....	24.0	8.46	32.46	114.5	147.0
Average kw.....	.143	.05	.193	.682	.875
Peak kw.....	.87	.207	1.077	.738	1.50
Load factor (15 min. weekly).....	16.4%	24.3%	17.9%	92.5%	58.3%
Connected load, kw.....	7.14	.....	.....	.814	.....
Demand factor (15 min. weekly).....	12.17%	.....	.....	90.7%	.....

ready available. These data together with other information are covered in Table I. The figures as shown in this table are



Figure 10.

for the average individual consumer and based on the tests of 150 consumers.

Table II shows the peak demands and annual revenue for the 3,000 range users in Spokane. The peak demands were obtained by calculation from the above tests and are therefore

TABLE II
Annual Revenue per Consumer Based on 3,000 Range Consumers,
Spokane, Wash.

	Kw-hr.	Peak	REVENUE		
			Total	Per Kw-hr.	Per kw. of Demand
Lights and appliances.....	400	0.16	\$21.80	5.45c	\$136.00
Range	1490	0.70	44.70	3.00c	64.00
Lights, appliances and ranges..	1890	0.86	66.50	3.52c	77.30

lower than the annual peaks which occur during the winter months. However, on the basis of the demands just determined, it is found the annual revenue per kilowatt of range demand is \$64 and for the total load \$77.30.

In conclusion the report states that, "It is certain that the method being used and followed will give the information desired for the final report," and that, "No definite conclusion can be cited at this time since all seasons of the year must be investigated before such can be determined."

Boise Tests

Appended to the general report is a report of tests made at Boise, April 25 to May 25, 1925. Two series of tests were run: first to determine the simultan-

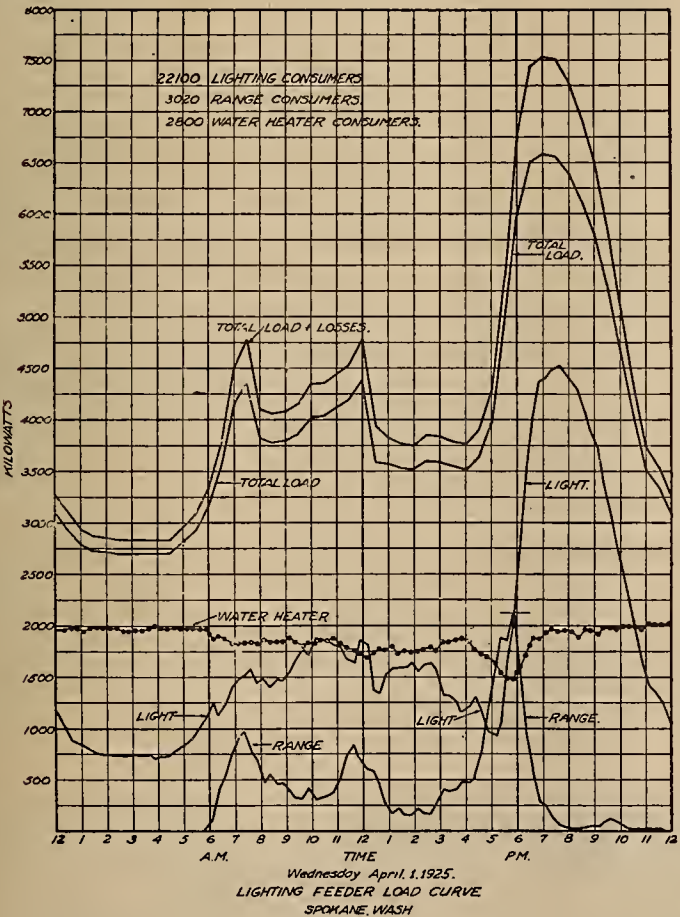


Figure 15.

eous demands of nine ranges, nine water heaters and nine lighting services; the second to determine the simultaneous demand of thirty ranges. In the first test, on the nine combined services, the peak demand over a two weeks' period was found to reach 2.47 kw. per consumer on a Monday between 5:45 and 6 p.m.

The average daily consumption during this period was 23.53 kw-hr. per consumer. The test on the thirty ranges, also continued over a period of two weeks, indicated a peak demand of 1.03 kw. per range on a Wednesday at about 6 p.m.

Commenting on the special conditions influencing the results of the first test, the report says:

The demand curves for test No. 1 show that the water-heater demand occurs at about the same time as the range demand. This is due very largely to the fact that no automatic or mechanical devices of any nature are used for disconnecting the water heater at the time the range is in use. The rate under which water heating service is furnished is extremely low and there is very little incentive for economy on the part of consumers using this class of service. Of the nine water heaters covered by test No. 1 only one was provided with an insulating cover of any description. It should also be pointed out that mangles are connected to the range circuits and that domestic appliances may be used on the range circuits by means of special outlets provided on the range or elsewhere. On account of this provision it is believed that the range demands reflect almost entirely the use of domestic appliances and that the lighting demands are those created by lighting only.

"One Good Sale Deserves Another"
Placed in Successful Operation

THAT a sale is not entirely a success unless it leads to other sales to the same customer, is a recognized principle of good merchandising. One company, the Valley Electrical Supply Company, of Fresno, Calif., has just launched a third appliance campaign upon that principle, and is reported to be succeeding with it as well as it did with two previous campaigns.

As a result of an electrical percolator campaign early in the year, 700 percolators had been sold to customers of the San Joaquin Light & Power Corporation, of which the Valley Electrical Supply Company is a subsidiary. Following up the percolator sales with a sale of electric fireless cookers, 2,000 of these appliances were sold. (Journal of Electricity, Sept. 1, p. 183.)

To establish a link between these new customers and the dealer, a little cookbook designed for use with the cooker was mailed to each purchaser, accompanied by a letter stating that the recipes had been especially prepared and tested for them.

With this contact established, the Valley company was ready to launch a follow-up campaign for electric toasters. To each purchaser of a cooker was sent a letter beginning, "Dear Madam: Presuming you like toast, as most folks do, and being so absolutely sure you have enjoyed your electric cooker, we just couldn't help taking this opportunity to tell you about a wonderful ELECTRIC TOASTER which we are going to sell for only \$3.95."

A circular accompanied the letter, and newspaper advertisements served as daily reminders of the sale. A special easy-payment plan was offered, and at the beginning of this third of a series of appliance sales campaigns, the toasters were selling at a rate which presaged results to exceed those in the previous two. Thus tactfully introduced, the following up with a new appliance sale to a satisfied customer on a previous sale would appear to be a natural and easy mode of merchandising.

BETTER MERCHANDISING

"Do You Love Your Wife?" Query Sells Ranges

Teaser Campaign of Medford Power Company and Dealers
Creates Interest and Results in Increased Sales

In an era of question marks, characterized by such unanswerable queries as "What is your husband doing?" and "Where is your wandering boy tonight?" a campaign for the selling of domestic appliances capitalizing this curiosity-arousing method, ought to be successful, if the results of popular magazines and movies are to be taken as examples. So reasoned the California Oregon Power Company and the electrical merchants of Medford, Ore., in planning their summer range sale. That they had hit upon a human weakness too common not to yield returns was demonstrated in the results of a thirty-day range sale in July and August.

"Do you love your wife?" was the question slogan they used to effect. And evidently to justify himself in the face of this query, every husband in Medford came down town to find out what it was all about, bringing with him, of course, his wife as evidence of good faith. It was then that the first effects of this unusual sales appeal were brought about. Particulars of the entire campaign, however, are interesting and novel.

The special thirty-day electric range campaign was put on by the California Oregon Power Company in Medford, Ore., during the period from July 15 to Aug. 15, 1925, in co-operation with the two local electric dealers to stimulate range sales during a normally dull season.

The active campaign was preceded by a "mystery" campaign of about ten days' duration, in which "teaser" posters, windshield stickers and newspaper advertisements were used to good advantage. The posters consisted of heavy cards with the query "Do you love your wife?" appearing in prominent black letters on a white background. These posters were placed at night along the highway at a distance of about 300 ft. apart for nearly five miles north and five miles south on the Pacific Highway, which runs north and south through Medford; also five miles east and five miles west on two of the main traveled roads entering the city. In addition, about 200 of these posters were placed in prominent locations within the city limits of Medford. This work was done by company employees, who were admonished to observe the utmost secrecy concerning the posters. Two reliable boys were employed to place the automobile stickers on the windshields of cars wherever the owners would permit them to do so.

A quarter-page display advertisement carried the same query in the local newspapers, as did also several lines of locals which were scattered throughout

the paper. A series of special news stories was prepared to stimulate interest in the mystery stunt and appeared nearly every day in the local papers. A slide in a local motion picture theater asked the question "Do

DO YOU
LOVE
YOUR
WIFE

?

If you do, be sure to have her downtown Saturday Night at 8:00 P. M.

you love your wife?" at every afternoon and evening performance.

The culmination of the "teaser" campaign was reached when a parade was staged on the downtown streets on a busy Saturday night. The parade was led by a brass band on a large truck and consisted of a number of trucks, de-

livery and touring cars, most of which carried at least one of the special model electric ranges which were featured during the campaign which followed.

Each of the trucks and automobiles was equipped with a set of banners, one on each side, containing such wording as "Do you love your wife? Prolong her life. Buy her an electric range. \$15-down payment puts one in your home," and other copy of a similar nature. One float which attracted a great deal of attention portrayed very graphically the comparison between the old-style hot kitchen with the old wood range and the new-style cool kitchen with the electric range. Large thermometers on each one of these displays registered the temperature which prevailed in each of these kitchens. A large crowd was on hand to witness the parade, considerable curiosity and interest having been aroused by newspaper stories and notices which stated that the answer to the all-important question "Do you love your wife?" would be revealed on the downtown streets Saturday night at 8 p.m.

The entire campaign was built around the sale of the electric range, installed and ready to use at a cost of \$15 down, the balance being payable in equal monthly payments to suit the customer but extending over a period not to exceed a year. Although one particular model range was featured throughout the campaign, special terms were allowed on all makes and models of electric ranges. It was felt that the results which were achieved through this campaign were very good for a town the size of Medford, a total of 75 ranges having been sold.

Out of 2,110 domestic consumers of this company in the city of Medford, approximately 625 of these customers are electric range users, which is a saturation of nearly 30 per cent notwithstanding the fact that the power company makes no attempt to merchandise ranges or appliances of any kind but refers this business to the electric contractor-dealers, of which there are but two in Medford.

There was no attempt to carry on a house-to-house campaign.



Some of the trucks used in the parade in Medford, Ore., answering the "Do You Love Your Wife?" query and pointing out that efficient home electrical equipment saves a wife's health

ELECTRIC IRONER DIRECTORY

Published and Copyrighted by the Journal of Electricity, October 15, 1925

A list of Electric Ironer Manufacturers giving catalog information on the equipment of each, with complete list of Western Distributing Agencies where repair parts may be secured. The publisher does not guarantee this information, but to the best of his knowledge it is correct at the date of publication. When referring to this list in any way, mention the Journal of Electricity.

Key to Abbreviations

E—electric heat
G—gas heat
Gn—gasoline heat
Wx—Westinghouse

GE—General Electric
R&M—Robbins & Myers
Dom—Domestic

WE—Western Electric
B—belt drive
G—gear drive

FC—foot control
HC—hand control
A—automatic
VM—various models

MANUFACTURER	TRADE NAME	Shipping Weight (lbs.)	Dimensions (floor space)	Length of Roll (in.)	Heat for Roll	Wattage for Roll	MOTOR		Drive	Control	Speeds	PRICE		WESTERN SALES REPRESENTATIVE	WESTERN DISTRIBUTORS	Nearest Point At Which Repair Parts May Be Obtained.
							Make	H. P.				East	West of Rockies			
Altortter Bros. Co. Peoria, Illinois	"A. B. C."	291 355	33x25	26 44	E E G	1350 2700	Wx Wx	1/6 1/6	B B	FC FC	.... ....	\$145 \$125 \$200 \$165	\$155 \$135 \$210 \$175	W. E. Peters 89 E. 12th St., Portland	A. A. Wilson 612 S. Spring St., Los Angeles E. W. Murray Lighting Co. 313 Riverside Ave., Spokane The Electric Service Co. 175 Park St., Portland	Western Distributors
American Ironing Machine Co. 844 W. Adams St., Chicago, Ill.	"Simplex"	VM	VM	26 to 56	E G Gn	VM	....	....	B	HC	1 and 2	VM	VM		Schluter Comm. Co., S. F. Fobes Supply Co., Portland, Seattle Schluter's, 745 So. Figueroa St., Los Angeles	San Francisco
Apex Appliance Co. 3223 W. 30th St., Chicago, Ill.	"Apex"	511 526	26x54	44 48	E G Gn	3200	GE R&M Wx	1/6	G	FC	....	\$160	\$170	A. M. Smith Co., 219 W. 3rd St., Los Angeles	A. M. Smith Co., 219 W. 3rd St., Los Angeles	Los Angeles
Apex Elec. Distribg. Co. 1067 E. 152nd St., Cleveland, Ohio	"Rotarex"	325	22x60	46	E G	3000	Own	1/6	B	FC	1		\$152.50 (Cash) \$167.50 (Time)	G. A. Buckley 1405 Walnut St., Kansas City, Mo.	Apex Elec. Distrib. Co. 681 Market St., San Francisco 1437 Welton St., Denver 2011 Broadway, Oakland 1024-11th St., Sacramento 2117 Ivey St., Fresno Illinois Elec. Co. Los Angeles North Coast Elec. Co. Portland and Seattle Electrical Equip. Co. Butte, Montana Intermountain Elec. Co. Salt Lake City	Western Distributors
Bernett Foundry & Machine Co. Irvington, N. J.	"Capitol"	470	60x24	46	E G Gn	2700	....	1/6	B	FC	....	\$155	\$170	.....	.....	Factory
Coffield Washer Co., The Dayton, Ohio	Grand Electric Home Ironer						GE	1/10				\$121.50	\$126.50	None	Poole Electric, Seattle A. A. Wilson, Los Angeles Electric Maid Shop, Portland Weiss Washer Co., Spokane Capital Electric, Salt Lake City Butte Electric Sup., Butte, Mont.	
Deming Mfg. Co., 5103 Lakeside Ave., Cleveland, Ohio	"Deming" "Automatic"	420	63x33	46	E G	3000	Ohio	1/4	G	FC	....	\$185 \$165	\$210 \$185	.....	General Appliance Co., 1340 E. 6th St., Los Angeles	Los Angeles & San Francisco Offices
Holland Mfg. Co. Holland, Mich.	"Holland Maid"	280	57x24	48	E G	....	GE	1/6	G	FC HC	....	\$165	\$175	.....	.....	Factory
Horton Mfg. Co. Fort Wayne, Ind.	"Horton"	320	22x42	30	E G	2000	GE	1/6	B	FC	....	\$140	.....	.....	A. A. Wilson Los Angeles Salt Lake Hdws Co. Salt Lake City Hexter & Co. Portland Schwabacher Hdwe Co. Seattle Holley-Mason Hdwe Co. Spokane	Factory
Hurley Machine Co., Chicago, Ill.	"Thor No. 75" "Thor No. 30"	468 285	54x25 22x26	44 or 50 31	E G Gn E G	1500 1000		1/6	G	A	2 A	\$165 \$160	\$180 \$167	Hurley Machine Co., 425 Rialto Bldg., San Francisco J. W. Ferry	Pacific States Elec. Co., San Francisco, Oakland, Seattle, Portland and Los Angeles Long Beach, San Diego, Phoenix	Western Distributors
The "1900" Washer Co. Binghamton, N. Y.	"1900"	450	27x53	44	G E Gn	2500	R&M	1/10	G	FC	....	\$160	\$175	.....	.....	San Francisco
Sperlich & Uhlig Co., Detroit, Mich.	"Ironrite" "Ironrite Du Fold"	410 180	26x63 16x18	46 24	E G E	3500 1150	Dom Dom	1/4 1/12	G G	FC FC	1 1	\$225 \$145	\$235 \$165	The L. C. Warner Co., 301 Occidental Ave., Seattle, Wash. The Easy Housekeeping Shop, Los Angeles, Cal.	.....
Rainbow Appl. Mfg. Co. Rochester, N. Y.	"Rainbow"	300 365	37x19 53x20	30 46	GE GE	....	GE GE	1/6 1/6	G G	A A	1 1	\$150 to \$220	.....	.....	.....	Factory
Utensils Co. East Pontiac Extended Fort Wayne, Ind.	"Utenco"	340	20x42	24	E G Gn	1000	GE	1/6	B	FC HC A	....	.....	\$165 \$165 \$175	.....	Listenwaller & Gough Los Angeles	Los Angeles
Western Electric Co. New York City	"Western Electric"	230	37x 24	28	G	WE	1/10	G	FC HC	\$95	\$110	Western Electric Co. 680 Folsom St., San Francisco	Western Elec. Co. San Francisco, Los Angeles, Oak- land, Portland, Seattle, Tacoma, Spokane, Denver, and Salt Lake City	All Branch Offices

ELECTRIC RANGE DIRECTORY

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A list of Electric Range Manufacturers giving catalog information on the equipment of each with list of Western Distributing Agencies where repair parts may be secured. The publisher does not guarantee this information but to the best of his knowledge it is correct as of the date of publication. When referring to this list in any way mention the Journal of Electricity.

NAME OF MANUFACTURER	TRADE NAME	Model or Catalog No.	Type of Unit O—Open C—Enclosed	Floor Area	Height from Floor	Oven Dimensions	DIMENSIONS					WATTAGE					RETAIL PRICE	WESTERN SALES REPRESENTATIVE	WESTERN DISTRIBUTORS	Nearest Point at Which Repair Parts May be Secured			
							SURFACE			OVEN		OVEN			SURFACE						OVEN		
							Large	Medium	Small	Simmer	Oven	Broiler	Large	Medium	Small	Total Watts					Broiler	Maximum Wattage	Temperature Control
Edison Elec. Appliance Co., Chicago, Ill.	"Hotpoint Hughes"	RS-67	O	28 1/2 x 52 1/2	57	18 x 18 x 14 1/2	6 1/2	6 1/2	6 1/2	2-12 x 12	12 x 12	12 x 12	12 x 12	12 x 12	12 x 12	7500	AC	\$235.50	Edison Elec. Appl. Co., Ontario, Cal.	All sales offices			
		R-79	O	28 1/2 x 62 1/2	70	18 x 18 x 14 1/2	"	"	"	4-12 x 12	12 x 12	12 x 12	12 x 12	12 x 12	12 x 12	12500	"	223.50	Edison Elec. Appl. Co., Los Angeles, Equitable Bldg., First and Spring Sts.				
		R-75	O	28 1/2 x 52 1/2	64	"	"	"	"	"	"	"	"	"	"	9000	"	325.00	Edison Elec. Appl. Co., San Francisco, 155 New Montgomery St.				
		R-63	O	28 1/2 x 28 1/2	41	"	"	"	"	"	"	"	"	"	"	6300	"	247.00	Edison Elec. Appl. Co., Seattle, 1320 Eighth Ave Portland, 10 North Broadway				
		R-85	O	28 1/2 x 28 1/2	33	"	"	"	"	"	"	"	"	"	"	7500	"	161.50	Edison Elec. Appl. Co., Salt Lake City, 60 East First St., South				
		R-87	O	25 x 44	41	16 x 12 x 18 1/2	6 1/2	6 1/2	6 1/2	9 x 12	9 x 12	9 x 12	9 x 12	9 x 12	9 x 12	5400	"	99.00					
		R-101	O	21 1/2 x 37 1/2	33	16 x 12 x 15 1/2	6 1/2	6 1/2	6 1/2	2-12 x 12	12 x 12	12 x 12	12 x 12	12 x 12	12 x 12	4200	"	76.75					
		R-105	O	28 1/2 x 52 1/2	57	18 x 18 x 14 1/2	6 1/2	6 1/2	6 1/2	2-12 x 12	12 x 12	12 x 12	12 x 12	12 x 12	12 x 12	7500	AC	210.00					
		RA-67	O	28 1/2 x 52 1/2	57	"	"	"	"	"	"	"	"	"	"	5200	"	223.50					
		RS-67	O	28 1/2 x 62 1/2	70	"	"	"	"	"	"	"	"	"	"	12500	"	235.50					
Electrahot Appliances, Inc., 301 Fifth Ave., South Minneapolis, Minn.	"Electrahot"	R-79	O	28 1/2 x 52 1/2	64	"	"	"	"	"	"	"	"	"	9000	"	325.00						
		R-75	O	28 1/2 x 52 1/2	41	"	"	"	"	"	"	"	"	"	"	6300	"	247.00					
		RA-63	O	"	"	"	"	"	"	"	"	"	"	"	"	184.00	"	197.83					
		RS-63	O	28 1/2 x 28 1/2	33	"	"	"	"	"	"	"	"	"	"	7500	"	212.50					
		R-87	O	25 x 44	41	16 x 12 x 18 1/2	6 1/2	6 1/2	6 1/2	"	"	"	"	"	"	5400	"	99.00					
		RA-101	O	21 1/2 x 24	33	"	"	"	"	"	"	"	"	"	"	4200	"	125.00					
		R-105	O	21 1/2 x 37 1/2	33	"	"	"	"	"	"	"	"	"	"	5200	"	83.00					
		R-109	O	25 x 43 1/2	30	15 x 15 x 10 1/2	7 1/2	7 1/2	7 1/2	10 x 15	10 x 15	1500	1500	1500	1500	7500	"	\$135.00	R. M. Burton, Alaska Bldg., Seattle	Seattle and San Francisco			
		B-57	O	56 1/2 x 26	58	18 x 18 x 12 1/2	8 1/2	8 1/2	8 1/2	16 1/2 x 17 1/2	16 1/2 x 17 1/2	1500	1500	1500	1500	9650	"		The Estate Stove Co., 180 New Montgomery St. San Francisco	Factory			
		E-184	C	56 1/2 x 26	58	18 x 18 x 12 1/2	8 1/2	8 1/2	8 1/2	16 1/2 x 17 1/2	16 1/2 x 17 1/2	1500	1500	1500	1500	9650	"						
Landers, Frary & Clark, New Britain, Conn.	"Universal"	E-91	C	27 x 43 1/2	52	14 x 14 x 19 1/2	8 1/2	8 1/2	8 1/2	16 1/2 x 17 1/2	16 1/2 x 17 1/2	1500	1500	1500	1500	8000	"	\$200.00	Landers, Frary & Clark, 335 New Call Bldg., San Francisco	Electric Appliance Co., The Elec. Corporation, Los Angeles, Seattle and Portland, Ore.	Universal Service Stations San Francisco Los Angeles Seattle		
		E-92	C	27 x 43 1/2	52	"	"	"	"	"	"	"	"	"	"	8000	"	215.00					
		E-95	C	"	51	"	"	"	"	"	"	"	"	"	"	7660	"	175.00					
		E-96	C	"	40	"	"	"	"	"	"	"	"	"	"	8210	"	190.00					
		E-93	C	"	40	"	"	"	"	"	"	"	"	"	"	7000	"	165.00					
		E-94	C	"	51	"	"	"	"	"	"	"	"	"	"	7000	"	180.00					
		E-90	C	27 x 29	61	"	"	"	"	"	"	"	"	"	"	7660	"	190.00					
		E-98	C	27 x 23 1/2	38	"	"	"	"	"	"	"	"	"	"	6660	"	150.00					
		E-99	C	"	"	"	"	"	"	"	"	"	"	"	"	6000	"	150.00					
		E-99	C	28 3/4 x 18	43	12 x 11 x 17 1/8	8	6 1/2	6 1/2	11 1/2 x 10 1/2	1-8	1100	1100	1100	1100	4250	"	\$420.00	P. F. Ross, Harry W. Lippert 715 Bryant St., San Francisco	Alexander & Lavenson, 926 Howard St., San Francisco	Manufacturers Warehouse San Francisco Los Angeles Warehouse Co., Los Angeles, Cal. No. Coast Elec. Co., Seattle, Tacoma, Wash. Portland, Ore.		

ELECTRIC RANGE DIRECTORY, Continued.

Manufacturer	Model	Size	Power	Price	Features	Distributors
Magee Furnace Co., Boston, Mass.	"Electric-Range"	45 1/2 x 26 1/4	33	16x12x13	9 7	San Francisco
Gen. D. Roper Corp., Rockford, Ill.	"Roper"	2001 2002 2003 2004 2005 2006 2007 2008 2009 2010	43 1/2 x 26 1/4 33 1/2 x 26 1/4 33 1/2 x 26 1/4 33 1/2 x 26 1/4 33 1/2 x 26 1/4 33 1/2 x 26 1/4 33 1/2 x 26 1/4 33 1/2 x 26 1/4 33 1/2 x 26 1/4 33 1/2 x 26 1/4	32 30 30 30 30 30 30 30 30 30	12x16 1/2 x 8 1/2 12x16 1/2 x 8 1/2 12x16 1/2 x 8 1/2 12x16 1/2 x 8 1/2 12x16 1/2 x 8 1/2 12x16 1/2 x 8 1/2 12x16 1/2 x 8 1/2 12x16 1/2 x 8 1/2 12x16 1/2 x 8 1/2 12x16 1/2 x 8 1/2	Central Stations C. B. Babcock Co., San Francisco P. B. Taylor, Marsh Strong Bldg., Los Angeles
Rathbone, Sord & Co., Aurora, Ill.	"Acorn"	E-61-S E-61-H E-61-E E-61-S E-61-E E-61-S E-61-E E-61-S E-61-E E-61-S	20x44 20x44 20x44 20x44 20x44 20x44 20x44 20x44 20x44 20x44	55 55 55 55 55 55 55 55 55 55	16x18 1/2 x 8 1/2 16x18 1/2 x 8 1/2 16x18 1/2 x 8 1/2 16x18 1/2 x 8 1/2 16x18 1/2 x 8 1/2 16x18 1/2 x 8 1/2 16x18 1/2 x 8 1/2 16x18 1/2 x 8 1/2 16x18 1/2 x 8 1/2 16x18 1/2 x 8 1/2	Portland, Seattle
Ruttenberg Elec. Co., Inc., Marion, Ind.	"Marion"	D-90 D-91 D-92 D-93 D-94 D-95 D-96 D-97 D-98 D-99	22 1/2 x 36 1/2 22 1/2 x 36 1/2 22 1/2 x 36 1/2 22 1/2 x 36 1/2 22 1/2 x 36 1/2 22 1/2 x 36 1/2 22 1/2 x 36 1/2 22 1/2 x 36 1/2 22 1/2 x 36 1/2 22 1/2 x 36 1/2	12x12 12x12 12x12 12x12 12x12 12x12 12x12 12x12 12x12 12x12	7 1/2 7 1/2 7 1/2 7 1/2 7 1/2 7 1/2 7 1/2 7 1/2 7 1/2 7 1/2	Through Leading Jobbers
Simplex Elec. Heating Co., 85 Sidney St., Cambridge 39, Mass.	"Simplex"	25 26 27 28 29	30 x 22 30 x 22 30 x 22 30 x 22 30 x 22	18x17 1/2 x 11 18x17 1/2 x 11 18x17 1/2 x 11 18x17 1/2 x 11 18x17 1/2 x 11	8 8 8 8 8	Universal Elec. Co., San Francisco Hobcock, Merrill & Stetson, San Francisco Raiman White, Elec. Co., Los Angeles Marshall Wells Co., Portland
Standard Electric Stove Co., Toledo, Ohio	"Standard"	756 757 758 759 760 761 762 763 764 765	26 1/2 x 34 1/2 26 1/2 x 34 1/2 26 1/2 x 34 1/2 26 1/2 x 34 1/2 26 1/2 x 34 1/2 26 1/2 x 34 1/2 26 1/2 x 34 1/2 26 1/2 x 34 1/2 26 1/2 x 34 1/2 26 1/2 x 34 1/2	61 61 61 61 61 61 61 61 61 61	11x14 1/2 11x14 1/2 11x14 1/2 11x14 1/2 11x14 1/2 11x14 1/2 11x14 1/2 11x14 1/2 11x14 1/2 11x14 1/2	Distributors
H. G. Weeks Mfg. Co., The Hamilton, Ohio	"Weeks"	52 53 54 55 56 57 58 59 60 61	23 1/2 x 16 1/2 23 1/2 x 16 1/2 23 1/2 x 16 1/2 23 1/2 x 16 1/2 23 1/2 x 16 1/2 23 1/2 x 16 1/2 23 1/2 x 16 1/2 23 1/2 x 16 1/2 23 1/2 x 16 1/2 23 1/2 x 16 1/2	35 35 35 35 35 35 35 35 35 35	18x14 1/2 18x14 1/2 18x14 1/2 18x14 1/2 18x14 1/2 18x14 1/2 18x14 1/2 18x14 1/2 18x14 1/2 18x14 1/2	Central Stations and Dealers
Walker & Pratt Mfg. Co., Boston, Mass.	"Western Electric Crawford"	18-91 18-92 18-93 18-94 18-95 18-96 18-97 18-98 18-99 19-00	25 1/2 x 45 1/2 25 1/2 x 45 1/2 25 1/2 x 45 1/2 25 1/2 x 45 1/2 25 1/2 x 45 1/2 25 1/2 x 45 1/2 25 1/2 x 45 1/2 25 1/2 x 45 1/2 25 1/2 x 45 1/2 25 1/2 x 45 1/2	32 1/2 32 1/2 32 1/2 32 1/2 32 1/2 32 1/2 32 1/2 32 1/2 32 1/2 32 1/2	18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2	Western Elec. Co., San Francisco, Los Angeles, Oakland, Portland, Seattle, Tacoma, Spokane, Denver, and Salt Lake City
Westinghouse Elec. & Mfg. Co., San Francisco, Cal.	"Westinghouse"	B-3-19 B-2-19 B-1-19 B-0-19 B-3-19 B-2-19 B-1-19 B-0-19 B-3-19 B-2-19	43 1/2 x 26 1/4 43 1/2 x 26 1/4 43 1/2 x 26 1/4 43 1/2 x 26 1/4 43 1/2 x 26 1/4 43 1/2 x 26 1/4 43 1/2 x 26 1/4 43 1/2 x 26 1/4 43 1/2 x 26 1/4 43 1/2 x 26 1/4	59 59 59 59 59 59 59 59 59 59	18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2 18x18 1/2	Fotes Supply Co., San Francisco, Oakland Seattle and Portland Illinois Elec. Co., Los Angeles Montana Elec. Co., Butte Mins & Smelter Supply, Denver, El Paso Intermountain Elec. Co., Salt Lake City Wash. Elec. Supply Co., Spokane

ELECTRIC REFRIGERATOR COMPRESSOR DIRECTORY

A list of domestic electric refrigerator compressors giving catalog information on the equipment of each, with complete list of Western Distributing Agencies where repair parts may be secured. The publisher does not guarantee this information, but to the best of our knowledge it is correct at date of publication. When referring to this list in any way, mention the Journal of Electricity.

Therm.—Thermostat Merc Therm—Mercury Thermostat Press Therm—Pressure Thermostat Cent—Century			Recip—Reciprocating Wx—Westinghouse GE—General Electric Cent—Century			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Lld—Leland DFM—Dayton Fan & Motor Co. WE—Western Electric			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. 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No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co. No. W—North Western			Wag—Wagner Em—Emerson Delco—Delco Light Co.<		
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ELECTRIC RADIATOR AND HEATER DIRECTORY

Published and Copyrighted by the Journal of Electricity, October 15, 1925.

A list of Electric Radiator and Heater Manufacturers giving catalog information on the equipment of each, with complete list of Western Distributing Agencies where repair parts may be secured. The publisher does not guarantee this information, but to the best of his knowledge it is correct at the date of publication. When referring to this list in any way, mention the Journal of Electricity.

Key to Abbreviations

B—Bronze
Br—Brass
C—Copper
G—Gold

Nk—Nickel
BS—Blue Steel
OI—Old Ivory

En—Enamel
Pr—Portable
Pd—Pendant

St—Stationary
Fr—Fireplace
VM—Various Models

NAME OF MANUFACTURER	TRADE NAME	Dimensions in Inches	Reflector Dimen. (Inches)	FINISH		Type	HEATING ELEMENT						PRICE		WESTERN SALES REPRESENTATIVES	WESTERN DISTRIBUTORS	Nearest Point at Which Repair Parts Can Be Secured.
				Heater	Reflector		Number of Elements	Total Wattage	No. of Heats	Removable Elements	Fits Edison Socket	East	West of Rockies				
Edison Elec. Appliance Co., Ontario, California.	"Hedlite" (High Wattage)	20x15 VM	14 VM	B OI En En	C	Po	1	630 1000 to 5000	1 1 to 3	Yes	Yes No	..... .....	\$6.50 to \$16.50 \$26.00 to \$56.00	Edison Elec. Appl. Co., Inc., Sales Offices & Service Sta.: Ontario, Calif., San Francisco, Los Angeles, Portland, Seattle, Salt Lake City	All Leading Jobbers.	All Sales Offices and Service Stations
Heat. & Mfg. Co., No. & Harrison Sts., Seattle, Wash.	"100% Radiators" "Heat-feet Registers"	..... 19x32 19x16	..... 16x 30 16x 14	En B Nk	....	Po St St	3 to 6 1 1	1200 to 8000 660 to 4000	3 to 6 3 3	No No Yes Yes	No No No No	..... ..... \$30.00 to \$60.00	\$22.50 to \$85.00 \$25.00 to \$50.00	Elec. Htg. & Mfg. Co., Seattle	Eastern Mfrs. Co., Portland Wholesale Electric Co., San Francisco Cumberland Light & Power Co., Cumberland, B. C., Canada R. Wolfberg, Inc., 1851 Industrial St., L. A. All Leading Jobbers	Seattle
Estate Stove Co., The Hamilton, Ohio	"Estate"	17x8	9 1/2	B	B	Po	1	660	1	Yes	No	\$7.50	\$8.00	The Estate Stove Co., Furn. Exchge. Bldg., S. F.	The Estate Stove Co., San Francisco	Factory	
Heat Elec. Co., 429 Canton Ave., Detroit, Mich.	"Even Heat"	17x9	....	En	N	Po	2	660	1	Yes	....	\$9.50	.....	H. J. Gute & Co., 150 Post St., San Francisco	H. J. Gute & Co., San Francisco Tacoma Mercantile Co., Tacoma North West Sales Co., St. Paul, Minn.	St. Paul, Minn.
Gerald Mfg. Co., The Winsted, Conn.	"Model C" "Model D"	18x14 17x12	14 12	En En	C C	Po Po	1 1	600 600	1 1	Yes Yes	Yes Yes	..... .....	..... .....	A. S. Chernoff Co., 41 Fell St., San Francisco		San Francisco
C. Gilbert Co., The New Haven, Conn.	"Polar Cub"	13x11	11	En	C	Po	1	550	1	Yes	Yes	\$5.00	\$5.25	H. E. Iblings, 4316 Franklin Ave., Los Angeles	In all large cities.	Distributors	
Heat Elec. Appliance Co., Chicago, Ill.	"The Sun"	19x14	14	En	C	Po	1	575	1	Yes	Yes	\$7.00	\$7.35	Deitch & Co., San Francisco Portland, Denver, Los Angeles		Sales Representa- tives	
Wesley Hicks, Rialto Bldg., San Francisco L. Hooper, 4536 Hollywood Blvd., Los Angeles V. Mooney, 354 5th St., Portland, Ore. Heat Elec. Appliance Co., Tampa, Fla.	"Wesix" "Radiant- Convection"	VM	....	....	....	Po St Fr	VM 800 to 6000	3	....	....	....	\$25.00 to \$150.00	.....	W. Wesley Hicks, Mfr. and Patentee, Rialto Bldg., San Francisco Sandoval Sales Co., Los Angeles and San Francisco H. V. Mooney, Portland, Ore.	All Jobbers	San Francisco Los Angeles Portland
Landers, Frary & Clark, New Britain, Conn.	"Universal" and "Thermax"	14x10 and 18x14	10 and 14	B	C	Po	1	625	1	Yes	Yes	\$5.50 to \$11.50	\$5.50 to \$11.50	Landers, Frary & Clark 335 New Call Bldg., San Francisco	Electric Appliance Co., San Francisco The Electric Corp., Los Angeles, Seattle, Portland	Service Stations, San Francisco, Los Angeles, Seattle	
Majestic Elec. Appl. Co., Inc., 500 Folsom St., San Francisco	"Majestic" "Radiant"	16x12 19x14 15x15 19x14	11 1/2 12 1/2 12 1/2	En En Nk En	C C C C	Po Po Po Po	1 1 2 2	615 615 760 960	1 1 1 1	Yes Yes Yes	No No No	\$7.50 \$9.50 \$25.00 \$12.00	\$7.50 \$9.50 \$25.00 \$12.00	Majestic Elec. Appl. Co., Factory & Main Office 500 Folsom St., San Francisco	All Leading Jobbers	San Francisco	
	"Radiant- Convection"	17x22 20x28 9x35	.... .... ....	B Br C	.... .... ....	St Fr St	.... .... 4000	2000	3	No No	No No	\$40.00 to \$115.00	\$40.00 to \$115.00			
Magnavox Company, Oakland, Calif.	"Magnaray" Radiant H1, H-2N, H-3S H-1-W H-2-W Radiant Air HF-3 HF-4 Air Circulation HC, HC-1 HC-V, HC-1-V	..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....	..... ..... ..... ..... ..... ..... ..... ..... ..... ..... .....	En En En En En B B En En En	Br Br Br Br Br G G G G G	Po Po Po St St Fr Fr Po	1 2 3 1 1 5 6 2 to 6 5000	500 660 990 500 1000 2000 2650 1670 to 5000	1 1 1 1 1 3 3 3 3 3	Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	No No No No No No No No No No No	..... \$19.00 \$25.00 \$20.00 \$30.00 \$65.00 \$75.00 \$27.00 to \$67.00	..... \$19.00 \$25.00 \$20.00 \$30.00 \$65.00 \$75.00 \$27.00 to \$67.00	The Magnavox Company, Oakland, Calif.	Alexander-Lavenson Co. Dunham, Carrigan, Hayden San Francisco Listenwaller & Gough, Los Angeles Fobes Supply Co., Seattle Stubbs Elect. Co., Portland Builders Service and Supply Co., Oakland	
Plaut & Co., 432-E, 23rd St., New York City	"Double Ray"	7x8	8 1/2	Br	C	Po	....	600	1	Yes	Yes	\$8.50	\$8.50	Ralph A. Ryan 417 Montgomery St., San Francisco	Reiman Whse. Elec. Co. Los Angeles	New York City
Prometheus Elec. Co., 360 W. 13th St., New York City	"Prometheus"	18x3	....	B	....	Po	5 10	1000 2000	3 3	Yes Yes	No No	\$40.00 \$50.00	\$40.00 \$50.00	M. E. Hammond, Pacific Bldg., San Francisco		New York City
Russell Electric Co., 340 W. Huron St., Chicago, Ill.	"Hold Heat"	15 1/2 x 12	12 1/2	En	C	Po	1	660	1	Yes	Yes	\$7.50	\$7.50	W. H. Carter, 1245 Broadway, San Francisco	North Coast Elec. Co., Seattle, Tacoma, Portland Spokane B. & R. Supply Co., Denver Listenwaller & Gough, Los Angeles and San Francisco Salt Lake Hdw. Co., Salt Lake City	Jobbers Stock	
Utterberg Elec. Co., Marion, Ind.	"Marion"	18x13	11 1/2	En	C	Po	1	615	1	Yes	No	\$10.00	\$10.00	A. E. Carroll, 55 New Montgomery St., San Francisco		San Francisco	
Scheffline Mfg. Co., 76 Tehama St., San Francisco	"Hulbert"	VM	....	....	....	VM	VM	660 to 6600	....	....	....	.....	\$35 to \$250	Scheffline Mfg. Co., San Francisco		San Francisco
Complex Elec. Heat. Co., 85 Sidney St., Cambridge, Mass.	"Sunbowl" "Sunbowl Jr."	20x14 15x12 1/2	14 10	En En	C C	Po Po	1 1	600 600	1 1	Yes Yes	Yes Yes	\$8.50 \$3.50 \$1.00	\$3.50 \$5.00	P. B. Miller, 137 5th St., San Francisco	Universal Elec. Co., S. F. Reiman Whse. Elec. Co., L. A. Marshall-Walls Hardware Co., Portland, Ore. Whitton Hardware Co., Seattle	Distributors	

(CONTINUED)

Frank E. Wolcott Mfg. Co.	"Torrid"	En	C	660	Yes	\$4.50	H. J. Guts. 150 Post St., San Francisco
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The publisher does not guarantee this information, but to the best of our knowledge and belief it is correct at date of publication. When referring to this list in any way, mention the Journal of Electricity.

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VACUUM CLEANER DIRECTORY

(CONTINUED)

Key to Abbreviations
SW—sweeper type
TR—truck type
ST—stationary type

Sh—switch on handle
Sc—switch on cord
Sm—switch on motor
Sf—switch on frame

R—rotating
Rg—gear driven
Rs—shaft drive
Re—chain drive

Bm—belt to motor
Bw—belt to wheels
S—stationary
V—vertical mounted

H—horizontal mounted
GE—General Elec. Co.
Dom—Domestic Elec. Co.
R&M—Robbins & Myra

Wx—Westinghouse
Berco—Birtman Elec. Co.
t—eastern price plus freight
*—price includes attachments

MANUFACTURER	TRADE NAME	Weight (in lbs.)	Style	Brush	MOTOR				Switch Control	Attachments	RETAIL PRICE				WESTERN SALES REPRESENTATIVE	WESTERN DISTRIBUTORS	Nearest Point At Which Repair Parts May Be Secured.
					Make	H.P.	Mounted	Attachments			Cleaner						
								East			West	East	West				
E. Vacuum Cleaner Co., Canhoe Road, Cleveland, Ohio	"Premier Duplex"	13½	SW	Bm	GE type	1/8	H	Sh	7	\$10.00	\$11.00	\$60.00	\$65.00	C. J. James, 236 So. Los Angeles St., Los Angeles C. A. Pearl, 61 Fifth St., N. Portland G. E. Tribble, 575 Mission St., San Francisco	Pacific States Electric Co., San Francisco, Los Angeles, Oakland, Portland, Seattle and Spokane Long Beach, San Diego, Cal., Phoenix, Ariz., Capital Electric Co., Salt Lake City	Pacific States Elec. Co., San Francisco, Los Angeles, Oakland, Portland, Seattle and Spokane, Long Beach, San Diego, Cal., Phoenix, Ariz. Capital Electric Co., Salt Lake City	
	"Cleveland"	13½	SW	S	GE type	1/8	H	Sh	8	\$5.00	.....	\$25.00	.....			
	"Liberty"	11½	SW	Bw	GE type	1/8	H	Sh	8	\$10.00	\$10.00	\$50.00	\$50.00				
	"Handy"	6½	.....	.....	GE type	1/8	H	Sc	6	.....	.....	\$40.00	\$42.50			
Eureka Vacuum Cleaner Co., Hamilton & Dewey Aves., Detroit, Mich.	"Eureka"	11	SW	S	Own	1/5	H	Sh	5	.....	.....	\$45.00	\$55.00	Eureka Vacuum Cleaner Co., 128 Post St., San Francisco	Factory Branches, San Francisco and Los Angeles Poole Electric Co., 1206 4th Ave., Seattle Eureka Vacuum Cleaner Co., 162 S. Post St., Spokane	From Factory Branch or from any Distributor.
Federal Electric Co., 700 So. State St., Chicago, Ill.	"Federal"	11	SW	Re	Own	1/6	V	Sh	6	\$3.00	\$8.50	\$55.00	\$55.00	Federal Electric Co., Landregan & Powell Sts., Oakland	Same	All Pacific Coast Jobbing Points	
P. A. Geier Co., 40 East 105th St., Cleveland, Ohio	"Super-Royal"	12	SW	S	Dom	.....	H	Sh	8	\$10.00	\$13.50	\$62.50	\$73.50	.....	J. G. Creighton Co., 53-4th St., Portland Listonwalter & Gough, Inc., 819 E. 1st St., Los Angeles 940 Mission St., San Francisco	From any distributor
Hamilton Beach Mfg. Co., 501 Rapids Drive, Racine, Wis.	"Hamilton Beach"	15	SW	Bm R	Own	1/5	H	Sh	8	\$3.50	\$9.00	\$32.50	\$61.00	Hamilton Beach Mfg. Co., Racine, Wis.	Sold direct to Dealers.	H. L. Hudson, 378 O'Farrell St., S. F. Gans Bros., 141 S. Main St., Los Angeles	
Hoover Co., North Canton, Ohio	"Hoover"	16½	SW	Bm	Own	.08	V	Sm	7	\$12.50	\$13.50	\$52.50	\$60.00	The Hoover Company, Geary & Leavenworth Sts., San Francisco		"The nearest Hoover District Office"	
	Model 103	15½	SW	Bm	Own	.09	V	Sm	7	\$12.50	\$13.50	\$65.00	\$74.00				
	Model 961	30½	SW	Bm	GE	.17	V	Sm	7	\$15.00	\$16.50	\$150	\$160				
Hurley Vacuum Cleaner Co., 18th Floor Steges Bldg., Chicago, Ill.	"Hurly-Thor"	15½	SW	Rs	.....	1/7	V	Sh	8	\$12.50	\$12.50	\$65.00	\$70.00	Hurley Machine Co., J. W. Ferry, 425 Rialto Bldg., San Francisco	Thor Shops, 154 5th St., Portland 213 Pine St., Seattle 124 Post St., San Francisco 306 W. 7th St., Los Angeles 1754 Broadway, Oakland	Thor Shops
Jewell Vacuum Cleaner Co., 226 N. Jefferson St., Chicago, Ill.	"Jewell"	11	SW	S	Own	1/5	H	Sh	4	\$5.00	\$5.00	\$39.75	\$39.75		Grether & Grether, Inc., 722 So. Los Angeles St., Los Angeles Hulse, Bradford Co., 844 Mission St., San Francisco North Coast Elec. Co., Portland & Seattle		
Kent Co., Inc., 583 W. Dominick St., Rome, N. Y.	"Kent Vacuna"	32, 48, & 72	TR & St	S	Wx	1/5 & up	V	Sf	10 & up	.....	.....	\$130 & up	\$130 & up	F. A. Tanner, 77 O'Farrell St., San Francisco C. W. Jones, 5987 Franklyn Ave., Hollywood, Calif. A. H. Cox & Co., 307 1st Ave., S. Seattle, Wash.	.....	Rome, N. Y.
Landers Frary & Clark, New Britain, Conn.	"Universal"	12	SW	.....	Dom GE WX	1/8	H	Sh	7	\$10.00	\$10.00	\$49.50	\$57.50	Landers Frary & Clark, 335 New Call Bldg., San Francisco	Through Jobbers Universal Service Station	San Francisco, Los Angeles, Seattle
L. S. Wright Co., 164 Fremont St., Worcester, Mass.	"Sweeper-Vac"	15	SW	R & Rg	Dom	1/5	H	Sh	7	\$10.50	\$11.00	\$57.50	\$65.00	F. W. Biven, 362 Jayne Ave., Oakland	A. Schleuter & Co., Oakland A. A. Wilson, Los Angeles Lance Sales Co., Portland Domestic Appl., Spokane		
M. K. Machine Co., Fort Wayne, Ind.	"O. K. Vacuum Brush"	3	SW	Bm	R&M	.....	V	Sm	.....	.....	.....	.....	\$27.50	United Vacuum Cleaner Stores	United Vacuum Cleaner Stores	Fresno, Calif.
The Regina Corp., Rahway, N. J.	"Regina Electric Home Cleaning Machine"	12	SW	S	GE	1/9	.....	Sh	8	.....	.....	\$69.75	\$69.75	The Regina Corp., 589-13th St., Oakland, Calif. San Francisco, Los Angeles, Sacramento, San Diego	.....	Oakland, Los Angeles, San Bernardino
F. Sturtevant Co., Byde Park, Boston, Mass.	"Sturtevant"	25 to 86	TR	S	.....	1/6 to 3	H	Sc	4 to 8	\$33.00 & up	.....	\$125 to \$1122	.....	.....	B. F. Sturtevant Co., San Francisco, Los Angeles, Portland, Seattle, Salt Lake City	
The Torrington Company, Torrington, Connecticut	"Torrington"	12½	SW	R	GE	1/5	H	Sh	9	.....	\$13.00	.....	\$65.00	National Elect. Sweeper Co., 4124-30 Broadway, Oakland	.....	Oakland
Western Electric Co., New York City	"Western Electric No. 12"	15	SW	Bm	Dom	1/5	H	Sh	6	\$11.50	\$12.50	\$57.50	\$60.00	Western Electric Co.	Western Electric Co., San Francisco, Los Angeles, Seattle, Portland, Denver, Salt Lake City	All offices	
	"Western Electric No. 14"	12	SW	.....	GE	1/5	H	Sh	6	\$7.00	\$8.00	\$36.00	\$38.00			
McClung Co., Ltd., New Philadelphia, Ohio	"Sunshine"	11½	SW	S	Wx	1/4	H	Sh	6	.....	.....	.....	.....	.....	United Vacuum Cleaner Stores, Main Office, Fresno, Calif. Mine & Smelter Supply Co., Denver, Colo. and Salt Lake City Chas. A. Eastman, 84 6th St., Portland, Ore.	Fresno, Denver, Salt Lake City, Portland
McClung Co., Ltd., New Philadelphia, Ohio	"America"	11½	SW	Bw	Arrow	1/8	V	Sf	6	.....	.....	.....	\$65.00		Elec. Service Co., Portland, Seattle Salt Lake Hdwe. Co., Salt Lake City	Portland, Seattle Salt Lake City
	"Columbia"	11½	SW	Bw	Arrow	1/5	V	Sh	6	.....	.....	.....	\$70.00			

WASHING MACHINE DIRECTORY

Published and Copyrighted by the Journal of Electricity, October 15, 1925

A list of washing machine manufacturers giving catalog information on the equipment of each, with complete list of Western Distributing Agencies where repair parts may be secured. The publisher does not guarantee this information, but to the best of our knowledge it is correct at date of publication. When referring to this list in any way, mention the Journal of Electricity.

Key to Abbreviations
 O—oscillating type
 VC—vacuum cup type
 Cl—cylinder type
 D—dolly type
 Im—impeller type
 DFM—Dayton Fan & Motor Co.
 Wx—Westinghouse
 GE—General Electric
 RM—Robbins & Myers
 Em—Emerson
 Dom—Domestic
 Cen—Century
 W—wood
 M—metal
 Sw—swinging
 St—stationary
 An—Anchor
 Am—American
 C—copper
 TC—tinned copper
 Cz—copper, zinc lined
 GI—galvanized iron
 Z—zinc
 VM—various models
 Al—Aluminum

MANUFACTURER	TRADE NAME	Operation	MOTOR		WRINGER	TUB			RETAIL PRICE		WESTERN SALES REPRESENTATIVE	WESTERN DISTRIBUTOR	Nearest Point Which Repair May Be Obtained	
			Horse Power	Maker		Type	Length in Inches	Dimensions	Capacity (Sheets)	Material				Eastern	West of Rockies
Altorf Bros. Co., Peoria, Ill.	"A. B. C."	Cl	1/4	Wx	M	12	22x24	6	GI	\$160	C. H. Sundberg, Los Angeles	A. A. Wilson, Los Angeles Electric Service Co., Portland	Distributors.	
		Cl	1/4	Wx	M	12	22x24	6	W	145				
		O	1/6	Wx	M	12	22x18	6	C	125				
		O	1/6	W	12	22x18	6	C	99					
		D	1/4	Wx	W	11	31x26	6	W	95				
		VC	1/4	Wx	M	12	24x18 3/4	8	C	150				
Apex Products Co., 6463 E. Ravenswood Ave. Chicago, Ill.	"Apex"	Im	1/4	Wx	M	12	24x15 3/4	8	C	155			Chicago, Ill.	
		O	1/6	GE	M	11	.....	6-9	TC	\$99				
		O	1/4	RM	M	12	.....	16	TC	135	145	165		
Apex Elec. Dist. Co., The 1067 E. 152nd St., Cleveland, Ohio	"Rotarex"	Cl	1/4	Own	M	12	17x18	8	G C	\$152.50 \$167.50	\$157.50 \$172.50	G. A. Buckley, 1405 Walnut St., Kansas City, Mo.	The Apex Elect. Distrib. Co., San Francisco, Denver, Fresno North Coast Electric Co., Portland, Seattle, Tacoma, Spokane Electrical Equip. Co., Butte Illinois Elec. Co., Los Angeles Inter-Mountain Elec. Co., Salt Lake City	Distributors
Automatic Elec. Washer Co., Newton, Iowa	"Automatic"	D	1/4	Wx GE	W or M	12	.....	6 and 12	C or W	\$122.50	\$132.50	C. J. Reid, 8 Front St., Portland H. J. Holt, 2206 High St., Oakland	Inter Mountain Elec. Co., Salt Lake City	Oakland Los Angeles Portland
Barlow & Seelig Mfg. Co., Ripon, Wis.	"Big 3"	VC	1/4	Em	W	11 and 12	.....	6 to 8	C	VM \$100 to \$150	VM \$110 to \$165	Dohrman Commercial Co., San Francisco Big 3 Washer Shop, 1616 4th Ave., Seattle	Dohrman Commercial Co., San Francisco	Distributor
Brammer Washing Mach. Co.,	"De Luxe"	Cl	1/4	RM	Sw	12	22x23	8	GI	\$165	H. J. Valentine, Burbank, Cal.		Los Angeles	
	"Ace"	Im	1/6	RM	Sw	12	20 dia.	8	TC	\$150				
									TC	\$110				
	"O. K."	D	1/4	RM	Sw	12	20 dia.	8	W	\$100				
									TC	\$115	\$102.50			
Buckeye Churn Co., The Sidney, Ohio	"Prima"	O	1/4	GE	Sw	12	.....	8	W or Al	\$160	.....	V. S. Scott & Son, 19 S. Roycroft Ave., Long Beach, Calif.	V. S. Scott & Son, 19 S. Roycroft Ave., Long Beach, Calif.	Distributor
Chicago Dryer Co., 2210-20 N. Crawford Ave., Chicago, Ill.	"Chicago"	O	1/4	Em	M	12 and 14	26x18 26x21 26x24	9 12 15	Cz	\$200 to \$375	VM	M. E. Hammond, Pacific Bldg., San Francisco S. W. R. Dally, Seattle Maritzen-Kuns Co., Los Angeles	Distributors	
Clarinda Mfg. Co., Clarinda, Iowa	"New Clarinda" " " "	D	1/6	GE	M	12	24x29	6	C	\$110	\$120	Thos. T. Hoffmirs, 6018 Vermont Ave., Los Angeles		
		D	1/6	GE	M	12	22x22	6	W	\$80	\$90			
		Cl	1/4	GE	M	12	25x25	6	C	\$135	\$145			
		O	1/4	GE	M	12	25x25	6	C	\$120	\$130			
Clament's Mfg. Co., 601-603 Fulton St., Chicago, Ill.	"Cadillac"	O	1/4	Wx	Sw	12	24x27	8	C	\$150	.....	J. J. Ross Mill Furnishing Co., Portland, Seattle General Appl. Co., Los Angeles		
Coffield Washer Co., The Dayton, Ohio	"AA-1" "DD-1"	O	1/4	Sp	Sw	14	22x22	10	TC	\$160	\$165	"Washer" Wilson, 819 So. Hill St., Los Angeles	"Washer" Wilson, Los Angeles Honeyman Hardware, Portland Poole Electric Co., Seattle	Distributors
		O	1/4	Sp	Sw	12	22x17 3/4	8	TC	\$150	\$155			
Conlon Corporation, 52nd Ave. and 19th St., Chicago, Ill.	"Incomparable Conlon"	Cl	1/4	GE	M	12	23x22	6	C GI	\$180 \$170	.....	Woodill-Hulse Elec. Co., Los Angeles	Same Welsbach Company, 863 Mission St., San Francisco	Distributor
Davis Sewing Mch. Co., The Dayton, Ohio	"Blue Bird"	O	1/6	GE Wx	Sw	11	16 1/2 x 27	8	C	\$160	\$160	C. A. Eastman, 213 Corbett Bldg., Portland	Blue Bird Appliance Co., Seattle Alexander & Lavenson, San Francisco K. P. Loop, McMinnville, Ore.	San Francisco
Eden Washer Corp., 80 Maiden Lane, New York	"The Eden"	Cl	1/4 1/6	RM	Sw	12	24 1/2 x 22	8 12	GI TC	..... \$160 \$175 \$185 \$200	L. M. Mintzer, 200 Davis St., San Francisco	L. M. Mintzer, 200 Davis St., San Francisco Woodill & Hulse Elec. Co., Los Angeles Eden Serv. Sta., Portland	Distributors	
Dawn Mfg. Co., The Stratford, Conn.	"Dawn"	VC	1/6	GE	Am	12	.....	6	....	\$90	\$93	Bacon Light Co., Los Angeles, Calif.		336 S. Broadway Los Angeles
Delco-Light Company, Dayton, Ohio	"Delco-Light"	O	1/6	DL	M	11	22x22	8	C	.....	\$160		W. L. Cochran, Inc., San Francisco Ivan L. de Jongh, Los Angeles Modern Appliance Co., Seattle	Distributors
Federal Electric Co., 8700 S. State St., Chicago, Ill.	"Federal"	O	1/4	Wx	L	....	32x27	8	C GI	\$175	\$175	Federal Electric Co., Landregan & Powell Sts. Oakland	Lushington Elec. Co., Seattle, Wash. Cook Bros., Los Angeles	Distributors
Foots-Burt Co., The Cleveland, Ohio	"Aerobell"	VC	1/4	GE	M	....	18 1/2 x 24	8	C	\$165	\$175	C. L. Hanson, 5021 2d Ave., Los Angeles		Los Angeles
G. R. S. Products, Inc., Albany, N. Y.	"G-R-S"	Cl	1/4	Own	Sw	12	.....	8 to 18	C GI	\$140 to \$220	.....	A. C. Holden, 1964 Eldorado Ave., Berkeley	Dealers	Factory
Gatz Power Washer Co., Morton, Ill.	"American" "Beauty" New Model 30 Gyrator	O	1/4	Wx	M	12	24x26	6	C	\$135	\$145	A. W. Evans, 345 S. Rugby St., Los Angeles	Same	Los Angeles
		O	1/4	GE	M	12	26x28	8	C	\$155	\$165			
		O	1/6	Wx	W	11	24x26	6	C	\$99	\$109			
		D	1/4	GE	M	....	24x26	9	C	\$155	\$165			
Geyser Electric Co., 5008 Bloomingdale Ave., Chicago, Ill.	"Geyser"	Cl	1/4	Em Dom	L	11	.....	3 to 9	C GI	\$75 to \$175	\$85 to \$135	Ion Arnold, Westminster Hotel, Los Angeles		Chicago, Ill.

WASHING MACHINE DIRECTORY

(CONTINUED)

Key to Abbreviations		D—dolly type		GE—General Electric		Cen—Century		St—stationary		Cz—copper, zinc lined				
O—oscillating type		Im—impeller type		RM—Robbins & Myers		L—Lovell		An—Anchor		GI—galvanized iron				
VC—vacuum cup type		DFM—Dayton Fan & Motor Co.		Em—Emerson		W—wood		Am—American		Z—zinc				
Cl—cylinder type		Co.		Dom—Domestic		M—metal		C—copper		NP—Nickel Plated				
R—Rotary		Wx—Westinghouse		Wg—Wagner		Sw—swinging		TC—tinned copper		VM—various models				
MANUFACTURER	TRADE NAME	Operation	MOTOR		WRINGER		TUB		RETAIL PRICE		WESTERN SALES REPRESENTATIVE	WESTERN DISTRIBUTOR	Nearest Point At Which Repair Parts May Be Obtained.	
			Horse Power	Maker	Type	Length in Inches	Dimensions	Capacity (Sheets)	Material	Eastern				West of Rockies
Haag Bros. Co., Peoria, Ill.	"Haag"	D Cl O	1/4	GE RM Em	W M M	12	.....	6 6 7	W TC TC	\$88 to \$145	.....	Richter Sales Co., Washington, Oregon, Western Idaho, Nevada, California Hansen Distributing Co., Salt Lake City	Representative or Distributors	
Horton Mfg. Co., Fort Wayne, Ind.	"Horton"	VC VC D D D	1/4 1/4 1/6 1/6	GE GE GE DFM	M M M M	12 12 10 10	27x27 27x27 25x25 25x25	8 8 6 6	C VE C W	\$155 \$165 \$122.50 \$85	.....	Baker Hamilton & Pacific Co., S. F. Hardware Jobbers A. A. Wilson, Los Angeles	Distributors	
Hurley Machine Co., 22nd St. & 54th Ave., Chicago, Ill.	"Hurley Thor"	CL	1/6 1/6 1/4 1/4		M W W W	11 12 14	.....	6 to 12	C or GI	\$135 to \$275	\$145 to \$285	Hurley Machine Co. J. W. Ferry, 425 Rialto Bldg., San Francisco	Pacific States Electric Co., San Francisco, Los Angeles, Oakland, Portland and Seattle Long Beach, San Diego, Phoenix	All branches of distributor
Johnson Washer Co., 40th & Adeline Sts., Oakland, Cal.	"Johnson Impeller" "Johnson"	Im D	1/4 1/6	GE Wg	Sw St	11 11	14x22 14x22	6 6	C C	\$100 to \$165	\$100 to \$165	Johnson Washer Co., 40th & Adeline Sts., Oakland, Cal.	Factory, Oakland F. C. Dollarhide, 1817 Industrial St., Los Angeles Domestic Elect. Appl. Co., 1901 3rd Ave., Seattle, Wash. Home Appliance Co., 87 Grand Ave., Portland, Ore. L. Brandenberger, Salt Lake City	Oakland Los Angeles Portland, Ore. Seattle, Wash.
Landers Frary & Clark, New Britain, Conn.	"Universal" "Whirlwave"	Cl O	1/4 1/4	RM Wx Wx	W M M	12 12	18x21 18x26	6 8	GI C C	\$150 \$162 \$150	\$150 \$162 \$150	Landers, Frary & Clark, Call Bldg., San Francisco	Electric Appliance Co., San Francisco Baker Hamilton & Pacific Co., S. F. Seattle Hdwe Co., Seattle Electric Corporation, Los Angeles Marshall-Wells Co., Portland	San Francisco and Los Angeles
Laundrette Mfg. Co., 1190 E. 152nd St., Cleveland, Ohio	Laundrette Wringerless Washer	VC	1/4	GE	No ne	17 1/2x26 1/2	6	C		\$160	\$170	Howard D. Mills, Old Colony Club, Palace Hotel, San Francisco	Modern Appl. Co., Seattle	Representative or Distributors
Maytag Co., The Newton, Iowa	"Maytag Gyrafoam"	Gyr	1/4	GE	Sw	12	22x22	6	A	\$155	\$165	Chas. H. Long, 1924 Broadway, Oakland, Calif.	Maytag of Calif., Oakland and San Francisco Schlueter's, Los Angeles Southern Electrical Co., San Diego Maytag Intermountain Co., Salt Lake and Denver Maytag Pacific Inc., Portland and Seattle Holley-Mason Hardware Co., Spokane, Wash.	Representative or Distributors
Meadows Mfg. Co., Bloomington, Ill.	"Meadow Lark" "Greyhound" Master No. 2 Laundrola	Cl O Cl O	1/4 1/4 1/4	RM and GE	M M M	11 11 11	18x20 18x28 18x20 18x30 18x22	6 8 6 12 6	GI C C GI C	\$135 \$155 \$150 \$150 \$125 \$220 \$130	\$150 \$165 \$165 \$125 \$220 \$130	Clifford A. Williams, 373 Brannan St., San Francisco	Walcherson Elec. Sales Co., San Francisco Fobes Supply Co., Portland, Seattle Capital Elec. Co., Salt Lake City Mina & Smelter Supply Co., Denver Butte Elec. Supply Co., Butte	All Jobber Representatives
Modern Laundry Mch. Co., Kansas City, Mo.	"Mola"	Cl	1/4	.....	W	12	.....	.....	.....	\$130	\$135	Geo. E. Prine, care of A. A. Wilson, 606 S. Spring St., Los Angeles	A. A. Wilson, 606 S. Spring St., Los Angeles	Los Angeles
One Minute Mfg. Co., Newton, Iowa	"One Minute"	R D	1/3 1/4	Wx Wx	Sw Sw	12 12	.....	6 6	C W	\$155 \$99	\$165 \$106	A. J. Ratelle, 619 Pine St., Seattle	Dohrmann Commercial Co., Parmelee-Dohrman Co., Los Angeles	San Francisco
Puffer-Hubbard Mfg. Co., 2601-32nd Ave., S., Minneapolis, Minn.	"Daylight"	VC	....	Em	W M	12 12	.....	.....	C W	\$155	\$165	Puffer-Hubbard Mfg. Co., 207 Railway Exchange, Portland	.....	.....
Savage Arms Corp., Utica, New York	Savage Washer and Dryer	R	1/4 1	Wx Wag	No ne	26 1/2x26 1/2	7	GI C	.....	.....	.....	C. W. Adams, Rialto Bldg., San Francisco	L. C. Warner Co., San Francisco, Seattle Hansen Furn. & Music Co., Brigham, Utah	Distributors
Sunbeam Elec. Mfg. Co., Evansville, Ind.	"Sunbeam"	O	1/6	Wx	M	12	19x23	8 6 18	C	\$155 \$135 \$235	\$170 \$150 \$260	F.M.Hills,647SpreckelsBldg.,San Diego O. N. Dolph, 800 Santa Fe Ave., Los Angeles	.....	San Diego
Sunny Line Appliances, Inc., 4058 Beaufait Ave., Detroit, Mich.	"Sunnysaids"	O	1/4		M	12	.....	.....	C	\$125 \$135	\$135 \$145	.....	Woodhill-Hulse Elec. Co., L. A. Poole Elec. Co., 1206-4th Ave., Seattle Dohrmann Commercial Co., Los Angeles	.....
Syracuse Washing Mch. Corp., Syracuse, N. Y.	"Easy Vacuum Elec. Washer"	VC	1/6	GE RM	M	12	.....	8	C GI NP	\$155 \$125 \$139	\$165 \$135 \$149	J. H. Gilson, San Francisco Syracuse Wash. Mach. Sales Co., 1109 Market St., San Francisco	Syracuse Wash. Mach. Sales Co., 1109 Market St., San Francisco	San Francisco
The "1900" Washer Co., Binghamton, N. Y.	"Cataraction"	O	1/4	RM	Sw	.....	.....	8	.....	\$155	\$165	.....	.....	.....
Western Electric Co., New York City	"Western Electric"	Cl	1/6	Own	Sw	11 1/2	22x23	6 to 8	GI TC	\$145 \$155	\$155 \$165	Western Electric Co., San Francisco, Los Angeles, Oakland, Seattle, Tacoma, Portland, Spokane, Denver, Salt Lake City	Western Electric Co., San Francisco, Los Angeles, Oakland, Seattle, Tacoma, Portland, Spokane, Denver, Salt Lake City	All Branch Offices
H. E. Williamson Co., 22 Grace St., San Francisco	"California Maid"	Cl	1/6	Cen	Sw	11	18x26	8	GI	.....	\$125	H. E. Williamson Co., San Francisco	.....	San Francisco
Woodrow Mfg. Co., Newton, Iowa	"Woodrow" "New Vertical Oscillator"	Im VO	1/4 1/4	Em Em	Sw Sw	12 12	.....	6 6 6	W C C	\$111.50 \$124.50 \$165	\$115 \$130 \$175	J. A. Woodrow, 507 Guaranty Bldg.,Hollywood, Cal.	W. E. Dooley & Co., Seattle	Distributors or Representative

IDEAS FOR THE CONTRACTOR

Dealer Solves Problem of Cut-rate Competition Unique and Inexpensive Plan of Solicitation Evolved by Portland Fixture Dealer Is Successful

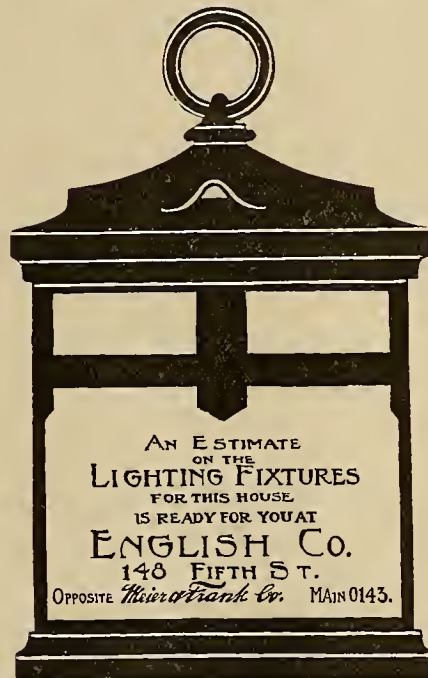
To meet competition from cut-rate fixture dealers on low-priced jobs in Portland, a procedure involving the keeping down of the cost of interesting and selling the prospect, J. C. English, of the English Company of that city, has devised a unique and inexpensive campaign of solicitation.

Portland's extensive building program of the last eighteen months has included a great many small residences, built both for sale and for owners, within the price range of \$2,500 to \$5,000. When it is stated that a large majority of the 5,000 residences built in Portland in 1924 were within this range, it may be seen that the volume in the fixture business was considerable, even though the specifications allowed only \$25 to \$50 for this item of the cost of each house. The program for 1925 promises to exceed 1924 in this class of residences. Complicating the situation, however, is the fact that a number of cut-price fixture dealers are after the business with a cheap line of fixtures, mainly by means of newspaper advertising featuring price only.

It should be understood here that the English Company is a fixture store exclusively. Not only standard fixtures of all prices are made and carried in stock, but also the most elaborate and distinctive kind of fixture is designed and manufactured to order. Mr. English, in determining to enter the field of the small job on a profitable basis, standardized and produced a small line of fixtures suited to the different rooms of the modern low-priced dwelling, and pictured these in a neat catalog convenient for mailing. These fixtures are displayed in a separate room on a different floor from the main sales room, and in keeping this class of business separate from the main business of the concern a two-fold advantage results. The customer of moderate means is not scared out by seeing around him the better fixtures at the higher prices; nor is the customer desiring the best in fixtures brought in contact with the cheaper goods, which might tend to cheapen the store in the eyes of that customer.

With this standardization of comparatively cheap fixtures as a basis, he built his campaign around a series of three sales letters ending in a particularly strong appeal designed to bring the prospect into his store. The first of these letters, sent twenty days after the issuance of the electrical permit, calls attention to the decrease in the cost of fixtures in spite of the increase in the cost of labor and material, due, as it is stated, to the policy of standardization of product. This letter in-

forms the prospect that a catalog is in preparation and will be sent to him later, and enclosed with it is a handy 6-inch ruler carrying the English Company advertisement. The second letter, sent three weeks after the first, has en-



Pasteboard sign which is used by the English Company in selling fixtures against cut-rate competitors

closed with it the catalog referred to in the first, and calls attention to the fact that this catalog contains "only a few of the hundreds of suggestions we have on display." The third, in the form of a printed card, is sent out about two or three weeks later, depending on the progress of the construction, and informs the prospect that an estimate on the fixtures for his house has been made and is on file at the office, and invites the prospect to call to see what fixtures have been suggested.

In the meantime an estimate actually has been made, and the final "punch" to the appeal has been delivered by the company representative making such estimate, in this way. A pasteboard sign, cut in the shape of a lantern and printed in black and yellow, facsimile of which is shown, is hung by the estimator on one of the center outlet wires of the living room of the house, after the roughed-in wiring job is completed and prior to the completion of the interior finishing of the house. This sign,

like the third letter sent out coincidentally, informs the owner or prospective purchaser of the house that "An estimate on the lighting fixtures for this house is ready for you at English Company". The attractiveness of the sign, its conspicuous location, the personal "punch" of its message implying thorough and intelligent treatment of the prospect's needs, all combine to make an appeal that is difficult to resist, particularly after the prior messages have paved the way for this climax.

It is a simple matter for a representative to visit many of these houses in a day and jot down a suitable selection of fixtures. This estimate is filed at the store to await the arrival of the prospect.

When the prospect enters the store the battle is half won. An experienced salesman here shows him the fixtures chosen on the estimate and talks home lighting to him with such effect as often to cause him to reject the cheap fixtures of the estimate in favor of others of a more attractive type and more expensive, in which, of course, there is a larger profit.

It readily may be appreciated that this procedure is simple and inexpensive. It is also apparent that some good sales psychology is utilized in that the customer is made to understand that intelligent consideration has been given his fixture problem, and he probably believes that more effort has been put on his problem than actually has been. That the campaign has been productive of results is indicated by the following figures supplied from the records of the English Company. In the last twenty days of June, 1925, 240 electrical permits were issued in Portland for houses of this class. This method of solicitation was applied to nearly all these, and forty per cent of the prospects responded to the appeal by going to the store. Sixty-seven per cent of these actually bought their complete fixture outfits from the English Company.

New Rules Put Into Effect by Department of Electricity

Many subjects of interest to contractors everywhere were included in a number of rules which recently were put into effect in San Francisco by Ralph W. Wiley, chief of the department of electricity of that city. They are as follows:

1. Permits for fixtures must be taken out and posted on the job the same as for wiring, in accordance with the provisions of Section "C" of Ordinance No. 5192.
2. Inspection fees must be paid in advance before permit will be issued.
3. Provisions of Ordinance No. 5192, Section "S," will be enforced, i. e., an extra fee of \$2.50 will be charged if the

Back of bill used by the Public Service Company of Colorado that lists various stores where the bill may be paid. It also calls attention to the value of holding stock in the company.

Contractor Has Efficient Shop and Store-Room Methods

A. V. Cline of Cline's Electric Shop, San Luis Obispo, Calif., has devised an efficient arrangement and method of conducting his shop and store room that can be adopted easily by any electrical contractor doing a corresponding volume of work. Mr. Cline does not have a regular stock clerk, and each journeyman is expected to assemble the material he needs for any particular job.

A number of bins are built along one side of the store room; in these, various classes of material are arranged in logical order. All of the finish material is kept together, as is the meter equipment and the like; all material for a particular operation being grouped in this manner. This saves a great deal of time in getting the material ready for any job. Mr. Cline uses a unit system instead of keeping an accurate stock record. A small card is placed on the front of each bin that states that a certain additional quantity should be ordered when the supply reaches a predetermined low point; that is, the card on a certain bin might read, "Down to 5, order 10". The man who reduces the stock to this amount immediately makes note of this fact on an order pad provided for this purpose.

Wire is arranged on coils at one end of the receiving bench; knobs and tubes are arranged in bins below the table. Wire which is scrapped on being returned from jobs is a source of considerable loss to most contractors. Mr. Cline has solved this problem by arranging his various sizes of wire on racks made of pipe extending perpendicular to the wall. When a journeyman returns from a job with some wire, he measures this and after marking the size and the number of feet on a tag, he attaches this tag to the coil and places it on its proper rack. The amount then is credited to the original job. When a journeyman is going out to make an installation which only requires a few feet of wire he is expected to look at the rack and see if approximately this amount of wire is not already measured up for him, instead of cutting this short length from a new coil, which is the usual wasteful method employed.

All material is marked with the selling price only. It is charged out to

each job at this selling price, regardless of whether or not it is a contract or a time-and-material job. The journeyman does not know what kind of a job he is working on from this standpoint. Mr. Cline believes that the material should bring the retail price, regardless of whether the job was taken on a contract or time-and-material basis. At the completion of each job, it is checked up by the bookkeeper to see just what the profit or loss has been, and this is brought to the attention of Mr. Cline immediately.

Mr. Cline has all booklets of manufacturers filed in a closet. When these become obsolete they are distributed in machines on the streets rather than having them destroyed. In this way they do some good instead of being a complete loss.

Building Contractor Sponsors Modern Electric Home

One of the model homes to be displayed recently in Oakland, Calif., was built and sponsored by R. C. Hillen, a building contractor. Casa Romero, as this model home was called, is of Spanish-Moorish type of architecture. It was built in the Court of All Nations, a new residential district made unusual by the presence of French, English, Italian, Belgian, Swedish and other homes of foreign types built by Mr. Hillen, after being planned and designed by W. W. Dixon, Oakland architect. Mr. Dixon also is editor of the Home Designer Magazine, which is published by Dixon and Hillen.

The home, completely furnished, was open daily for inspection during two weeks, with a hostess in charge. A great deal of newspaper publicity and advertising drew attention to the home during this period. In all of this publicity especial emphasis was placed on its electrical features.

Every comfort of the modern American home was provided in the house. Electricity played a most conspicuous part in making this possible. The house was heated with Majestic flush-type air heaters, this load totaling 14.5-kw. A 7-kw. all-white-enamel Hotpoint range occupied a prominent place in the kitchen. The kitchen also was provided with a ventilating fan. Water was heated with a 5-kw. Thermelect heater.

The laundry was adequately equipped with labor-saving devices, including an electric washing machine and electric ironer.

Radio Is Feature

Probably the most unusual part of the electrical installation was that of the radio, which was installed in the studio-living room. The rare acoustic properties of this room 18 x 36 ft. in size, and 18 ft. high, was utilized fully. The loud speaker was hidden behind what appeared to be a pipe organ in the balcony above. The tone, released from this height, was finer and sweeter than when heard in an ordinary room, and more natural. The Radiola super-heterodyne was located conveniently at the lower left-hand corner of the long room. Wiring and outlets were installed so that connections could be made by either loud speaker or ear phones in any room in the house.

The many smaller electrical appliances were displayed prominently, including coffee urn, percolator, waffle iron, toaster and vacuum cleaner. The sewing room, built on the mezzanine floor, was equipped with an electric sewing machine. The lighting, designed with particular regard for the kind of work to be done in the room, was an especially attractive feature.

The lighting throughout the home was given careful treatment, and all the bracket lights in the bedrooms and den were properly shaded so as to prevent glare. Tables, bridge and floor lamps were located conveniently in the different rooms to provide proper light for reading, sewing and similar uses. The general lighting in the kitchen was supplied from a totally enclosed unit in the center of the ceiling, and local lighting over the sink was provided from a shaded lamp. The living room and bedrooms were lighted entirely from brackets on the walls.

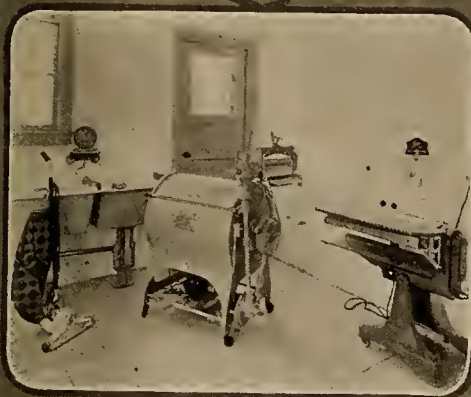
From the electrical industry's viewpoint, this home was very unusual in that it was sponsored and built by a building contractor. Mr. Hillen makes the electrical installation a feature in all of the homes he builds, and this fact is brought forth prominently in all advertising and publicity regarding the houses. This builder has taken advantage of the tremendous value of a complete electrical installation as an argument in selling modern homes.



Store room of Cline's Electric Shop showing material bins and receiving table, which also is used for measuring wire and assembling material.



Corner of shop showing method of storing stock of wire. Small quantities are measured and tagged before being placed in stock for future use.



PICTURES of Casa Romero, modern electric home which was built and sponsored by R. C. Hillen, a building contractor in Oakland, Calif. The studio-living room is shown in the picture on the right in the second row from the top; the pipe-organ radio may be seen in the center of the balcony. The Radiola is located at the lower left-hand corner of the room. The lower picture of the kitchen shows the ventilating fan and some of the smaller appliances. The electric ironer and washing machine are to be seen in the laundry room to the left. The picture of the bedroom shows the electric air heaters and the radio loud speaker. Note that all of the bracket lamps are shaded.

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Power Company Communication Systems—I (a) Protective Equipment Especially Important Where High-Line Telephone Lines Are on Power Poles

By H. N. KALB*, Telephone Engineer, San Joaquin Light & Power Corporation,
Fresno, Calif.

Demands made upon the electric light and power companies of today for service are extremely exacting. The home wants electric lights and seldom makes provision for the electricity being off, beyond having one or two candles

be separated by some distance and transmit their power over separate transmission lines. This modern arrangement is such that it would be necessary to have several simultaneous cases of serious trouble scattered over a large area before service would receive more than a momentary interruption. With this thought in mind the next question is, how can these remotely located generating stations and the attending substations best be kept in constant communication with one central point where the whole system can be controlled and the power supply changed from one point to another as load conditions may necessitate.

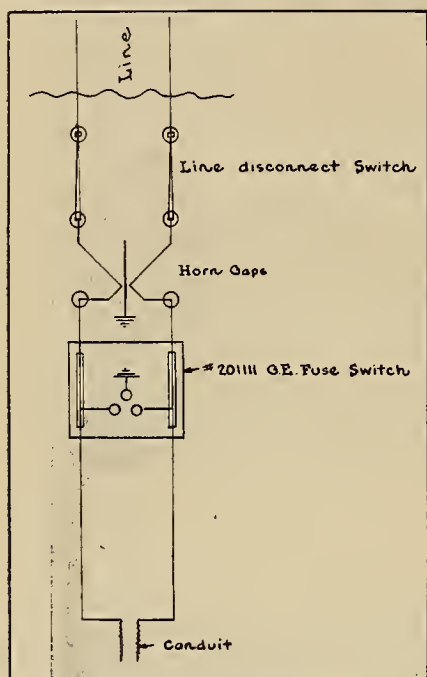


Fig. 1. Typical scheme of telephone protection at substations

stored away some place or maybe a small flashlight in the side door of the automobile. The movie theater depends upon 100 per cent electric service from about noon to midnight. Factories depend upon electric motors to operate continuously all day and sometimes during the night hours. The bakery must have continuous service once it starts making a batch of bread or pastry and the ice company must have continuous service or it will lose much of its product. Motors furnishing the water supply for a town or city must have power at all times or serious handicap may result in case of fire. And so on through regular daily life are becoming more and more exacting the requirements for uninterrupted electric service.

In order to insure against serious interruptions it is necessary then that a power company have more than one source of power and that these sources

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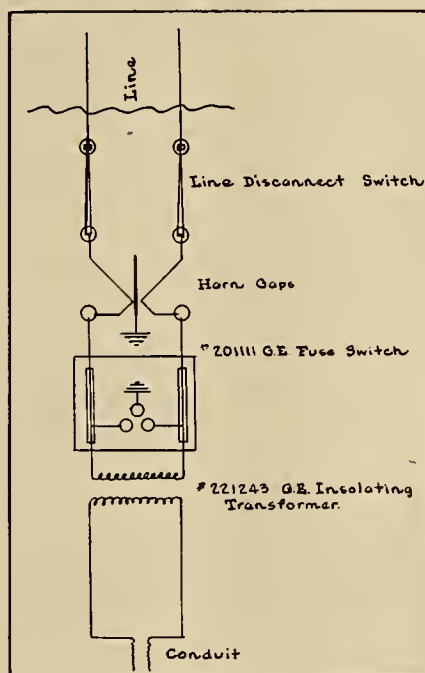


Fig. 2. Typical scheme of telephone protection at offices and power houses

There is no means of communication that is as universally used and as well understood as speech. The best method of transmitting speech is by telephone. This may be by wire or by space radio, but the most common way is by means of wire lines. Wire lines for telephone service have reached a point of high development as applied to public use. In connection with their use by power companies the requirements are even more exacting than for public use. Power companies usually have a load dispatcher located at or near headquarters and this load dispatcher must be

able to talk to all power houses, substations and repair crews with a minimum of delay. A delay or a wrong order given or an order misunderstood may mean the loss of much money to the power company or to the consumer or it may mean even the loss of lives. Therefore it is essential that this dispatcher have the best possible communication service with all points on the system or the whole system may fail. The communication lines are the nerves of the whole power system and therefore must be protected and cared for in the best possible manner.

To provide an adequate communication system for power companies, wire telephone lines usually are provided, and to receive the maximum benefit from these lines with the least expense they generally are placed on power line poles. These power poles usually carry voltages varying from 10,000 to 70,000. As it is known that power wires do break and fall down, it is necessary to provide protection that will protect fully not only the users of the telephone but the apparatus as well. It must be remembered also that when a telephone wire is placed close to a power wire the telephone wire becomes charged by induction to an extent which varies inversely as the distance between the telephone and the power wires. This is only an approximate ratio and will be taken up again.

The first thing, then, that must be provided for on telephone lines carried on power poles is protection—adequate protection. What is the voltage of the



Fig. 3. Typical 3-line telephone protection rack

power wires above the telephone wires? Most power companies have telephone circuits on power poles which carry not over 70 kv., as above that power-line voltage the operation of telephone lines requires so much separation from the power wires that the increased cost of the pole line (due to the necessity for higher poles) becomes a deciding factor. Usually it is more economical to build a separate pole line for the telephone wires. So it may be considered that 70 kv. is the highest voltage against which protection will be needed.

In protecting power company telephone lines the equipment must be such that it will operate readily, will care for large currents and when the disturbance is over with will leave the line clear for operation. There always will

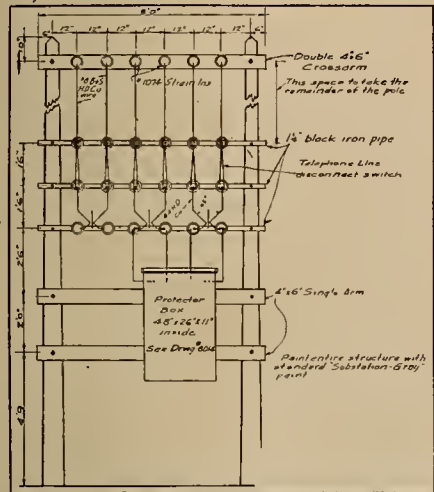


Fig. 4. Design details of three-line telephone protection rack for substations using wood construction

be cases in which this protective apparatus can not clear itself after the disturbance so that equipment must be located where there is an attendant in order to insure against a prolonged interruption. It has been found by test and by experience that a 16-in. gap will break all arcs formed on these telephone lines. Therefore all line disconnects and paralleling switches are made on 18-in. centers or with a 16-in. minimum clearance. On the station side of the line disconnect switches are installed horn gaps made of No. 4 hard-drawn copper and set 50 mils from a 5/8-in.

steel ground rod. From the station side of these horn gaps the line is taken through expulsion-type fuses which are filled with 1/2-amp. fuse wire. This fuse wire is doubled except for the lower 1 1/2 in., which point is in the expulsion chamber.

This fuse must be placed in a vertical position and with the expulsion chamber at the lower end. On the station side of these fuses a set of arcing gaps, either knurled or sawtooth, is set with a spacing of about 15 mils. This is for telephone lines which operate with a normal voltage to ground of 400 volts or less. These expulsion-type fuses should have a clearance between upper and lower ends of not less than 10 in. From the station side of the fuses the line may be taken through underground conduit directly to the telephone switches in the substation by the use of No. 14 copper rubber-covered wire. (For schematic diagram see Fig. 1.) In such a case the operator should be provided with an insulated platform on which to stand while using the telephone so that he will be amply protected in case of power line disturbances.

Where the telephone line is to be taken into a power house or into an office a telephone insulating transformer is interposed between the station side of the fuses and the conduit. (For schematic diagram see Fig. 2.) It must be remembered that the case of this transformer must be grounded securely in order to remove any possible static charge that might be passed between windings in the transformer. After this has been done the final test is to place one hand on the incoming wires and the other hand on any ground connection. If any voltage is present the installation is defective. An ordinary voltmeter cannot be used for this test as it is not delicate enough to give an indication. The insulation on these transformers is tested for 25 kv. and although designed for outdoor use it is well to have them protected from the weather. The insulating compound is affected to a considerable extent by extreme temperatures.

This protective equipment should be mounted on suitable supports out of doors as shown in Fig. 3 and Fig. 4. Fig. 4 shows the use of wood poles, but a better and not much more expensive job can be made by the use of pipe as shown in Figs. 3 and 5. These protec-

tion racks are designed in two sizes, one for a maximum of 3 lines and one for a maximum of 5 lines. A one-line installation is shown in Fig. 6. This is for mounting on the outside of a brick

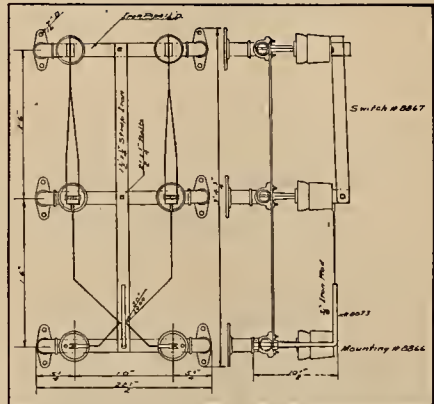


Fig. 6. One-line, wall-type telephone protector

or concrete building. In all cases the fuses and small arcing gaps are mounted inside of the protector box, which should be of ample dimensions, as shown in Fig. 7. This last is very important as when the fuse blows un-

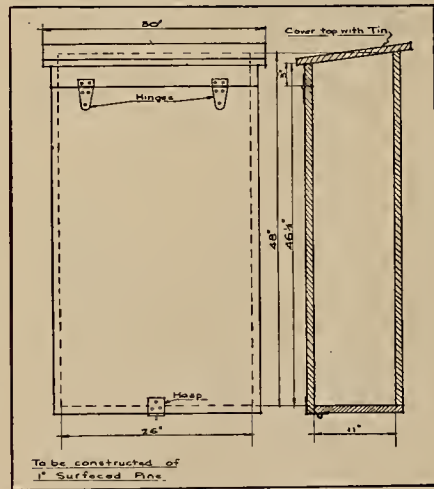


Fig. 7. Design details for fuse box for telephone protective apparatus

der a heavy current there must be ample room between the top of the fuse holder and the top of the box. If the space is insufficient, an arc will be started between the top of the fuse holders and the box then will be set on fire.

Editor's Note: This is part of the first of a series of articles by Mr. Kalb in which he outlines the special features of power company telephone systems and the protective equipment involved. The article will be continued in the next issue.

The Cumberland Street Hospital of Brooklyn, N. Y., has a surgical electromagnet of sufficient strength to pull out a needle imbedded in a finger. It has to be watched carefully to keep it from attracting all the loose surgical instruments in the vicinity.

Wifey took off her hat and slammed it upon the floor and then she turned to her husband. "I'll never go to another party with you as long as I live."

"Why?"
"You asked Mrs. Chester how her husband was standing the heat and her husband has been dead for six months."



Fig. 5. Design details of three and five-line telephone protection racks for substations using pipe framework

NEWS OF THE INDUSTRY

"Jobbers—If Any" Eclipses All Else at the Del Monte Quarterly Meeting

The quarterly meeting of the Pacific Coast Electrical Supply Jobbers' Association was held at Del Monte, Calif., Sept. 24-26. By an interesting coincidence it is just one year since a similar meeting was held at the same place and the main building of the Del Monte Hotel was destroyed completely by fire.

The closed sessions were called to order by O. B. Stubbs, president of the Association, with Albert Elliot acting as secretary.

On the evening of Friday, the 25th, the jobbers and their guests were treated to a real surprise by the manufacturers' group who, unknown to the industry, had succeeded not merely in writing but producing a play, or playlet, which they had been rehearsing diligently for many weeks. A corner of the dining room was partitioned off and a temporary stage erected. At nine o'clock the expectant audience assembled was treated to its first thrill when the programs were distributed by Ben Holst, whose function seems to have been a combination of ticket taker, program vendor and purveyor of ice water, to say nothing of his having been cast for one of the leading parts. The play itself was entitled "Jobbers—If Any" and was described in the program as a tragedy in one act and three scenes, written by Chance, edited by The Manufacturers, passed by the National Board of Fire Underwriters, and dedicated by The Manufacturers to the Indispensable Jobbers who, according to the program, "Can do no Wrong."

The cast and the musical program are worthy of repetition verbatim:

THE PLAYERS

In the order of their appearance.

Yukon Jake, Stock Man.....Harry Garbutt
I. M. Lightnin, Pick-up Boy.....Frank Beck
Bull Montana, Office Boy.....Sandy
Nina Knight, Stenographer.....Chubby
Pee W. Wiggely, Jobber.....Miles Steel
Day Later, Postman.....Garnett Young
Mike Gogett'em,
Contractor.....Garnett Young
J. Algernon Buttinsky,
Hebrew Salesman.....Ben Holst
Johnnie Walker,
Bootlegger.....Ray Murphy
Ford C. Dan, Chauffeur.....Tom Sawyer
R. Beresford Fox, World-
Wide Ambassador.....Bill Shreve
Scenery by No. 6 Local.
Costumes by Union Iron Works.
Millinery by Pacific Manufacturing
Company.
Shoes by Salvation Army.
Cosmetics by Hercules Powder Com-
pany.
Music by Gin's Little Synthetic Or-
chestra.
Director.....Pete Bach
Photographer.....Eddie Himmel
Chief of Photography Staff of the R.
Forrest Oakes Productions, Ink.
Look out for flying parts—"Let's Go."

MUSICAL PROGRAM

By

Gin's Little Synthetic Orchestra.

OVERTURE—

"Sad Music Befitting the Occasion."

SCENE 1—

"Laughing Song" from "Hyena."

SCENE 2—

"Yes, We Have No Bananas" from
"Habit."

SCENE 3—

"Just Pickle My Bones" from "Bot-
tle."

EXIT—

"Three Swallows" from "Johnnie
Walker."

As to the play itself, it was full of subtleties, some delicate and some "hard-boiled," satire, wit, humor and pathos, the audience running the gamut of all the human emotions as the actors made their entry and after a struggle were identified beneath many examples of fearful and wonderful powers on the part of the make-up man.

The story itself depicted a jobbing establishment, which we hope is not too typical. The first action took place when a customer arrived seeking to acquire by fair means or foul five feet of conduit and one socket. Fortunately there was a piece of conduit in stock, and Yukon Jake, the stock man, essayed to perform a surgical operation on the piece of conduit with a super-dull hack-saw, while Lightnin, the pick-up boy, introduced certain inquiries concerning the customer's credit. The customer, proving to have no credit, waxed wrathful when his order was refused and proceeded to deliver a homily on the subject of service and the absence of stock in the jobbing emporium of Mr. Wiggely. Service was what Mike Gogett'em wanted and that was why he had been placing all of his business with a rival concern and paying their bills promptly. When Buttinsky, a salesman, importuned the enterprising jobber for business and waxed eloquent over the advantages of carrying sufficient stock,



When they were not sitting in on or acting in the "drammer," the jobbers were not slow at a favorite Scotch entertainment. As for the play, they were dressed for the part, as witness: 1. O. B. Stubbs, president, Stubbs Electric Company, Portland, and chairman, Pacific Coast Division, Electrical Supply Jobbers' Association; 2. H. L. Harper, manager, Western Electric Company, Los Angeles; 3. Ray W. Murphy, Pacific Coast manager, Westinghouse Lamp Company; 4. H. E. Sanderson, Pacific Coast manager, Bryant Electric Company; 5. Mrs. D. E. Harris, wife of the president of the Pacific States Electric Company; and 6. C. C. Hillis, president, Electric Appliance Company, all of San Francisco

he had a severe lesson from the proprietor on the subject of turn-over, after which he was ignominiously thrown out. However, witness the change in the reception of Johnny Walker, whose garb proclaimed the fact that he could be none other than a bootlegger, who had no difficulty whatever in persuading the jobber of the advantages of carrying a large stock of pre-war, aged-in-the-wood Scotch at \$100 a case.

However, Mr. Wiggely eventually saw the error of his ways and, succumbing to the persuasions of his faithful staff, wrote to all the salesmen in town to call upon him at once and help to fill his empty shelves, with the understanding, of course, that Mr. Wiggely would regard with certain favor special privileges in the way of consigned stock. When Mr. Wiggely was turned down cold on the consigned stock idea and his discounts of eighty, two or three tens and several fives, winding up in a climax when the low-priced lamp offered by Mr. Buttinsky ignominiously failed under test, then the stage was set properly for the climax when Mr. R. Beresford Fox, who looked all of it, entered, preceded by his chauffeur and sample case, and with a distinguished air assured Mr. Wiggely that he had been accepted as a distributor for the World-Wide Electric Company, that he would be graciously permitted to carry all the stock for which he could pay cash and would be granted a special concession of 5 per cent off list. The play closed with Wiggely dictating a batch of letters to all of his distributors advising them of the great honor that had been done him by World-Wide and that now they would have an opportunity of tying in on national advertising so that their fortune was assured.

Truly this was an all-star aggregation, a remarkable amount of latent dramatic talent having been uncovered with the opportunity to turn Thespian afforded by this jobbers' meeting. In such an array it is difficult to discriminate, but a word must be said for Miss Knight, the stenographer—a part played in masterly fashion by F. A. Gerhardt. The meticulous observance of modern fashions in young women's apparel caused a great deal of comment, some of it being distinctly audible from quite a distance. In fact, this rising young actor "outflapped" any flapper that has ever been seen upon the Pacific Coast. Like many other things, he, or she, should have been seen to be truly appreciated, but the finished artistry of his performance, his deft manipulation of the powder puff and lip stick completely dwarfed into insignificance the few words of dialogue which a heartless author permitted him to utter.

The play was such a success that the golf tournament and the golf banquet, ordinarily the chief events of this gathering, lost their position in the limelight; nevertheless there was no lack of interest in the fact that P. H. Booth, Pacific Coast manager, Edison Electric Appliance Company, Los Angeles, won the famous copper cup; W. S. Berry, manager, Western Electric Co., San Francisco, the Deming trophy, and C. B. Hawley, vice-president and general manager, Intermountain Electric Company, Salt Lake City, the Turner trophy. The East Indian festivities that preceded the golf tournament were well at-

tended and enthusiastically supported. Ten excellent judges of horseflesh profited greatly by their good standing with the little god of chance.

All in all, it was one of the most successful meetings ever held by the Jobbers' Association, the attendance being considerably above average.

Forty Years Power Needs for Vancouver Will Be Met by Bridge River Development

The Bridge River power development in British Columbia with a possible ultimate capacity of 550,000 kva., or approximately 700,000 hp., will be proceeded with by the British Columbia Electric Railway Company. (Journal of Electricity, Oct. 1, 1925, p. 26.) Announcement to this effect was made by George Kidd, president of that company at the opening of the enlarged Stave Falls plant on Sept. 19.

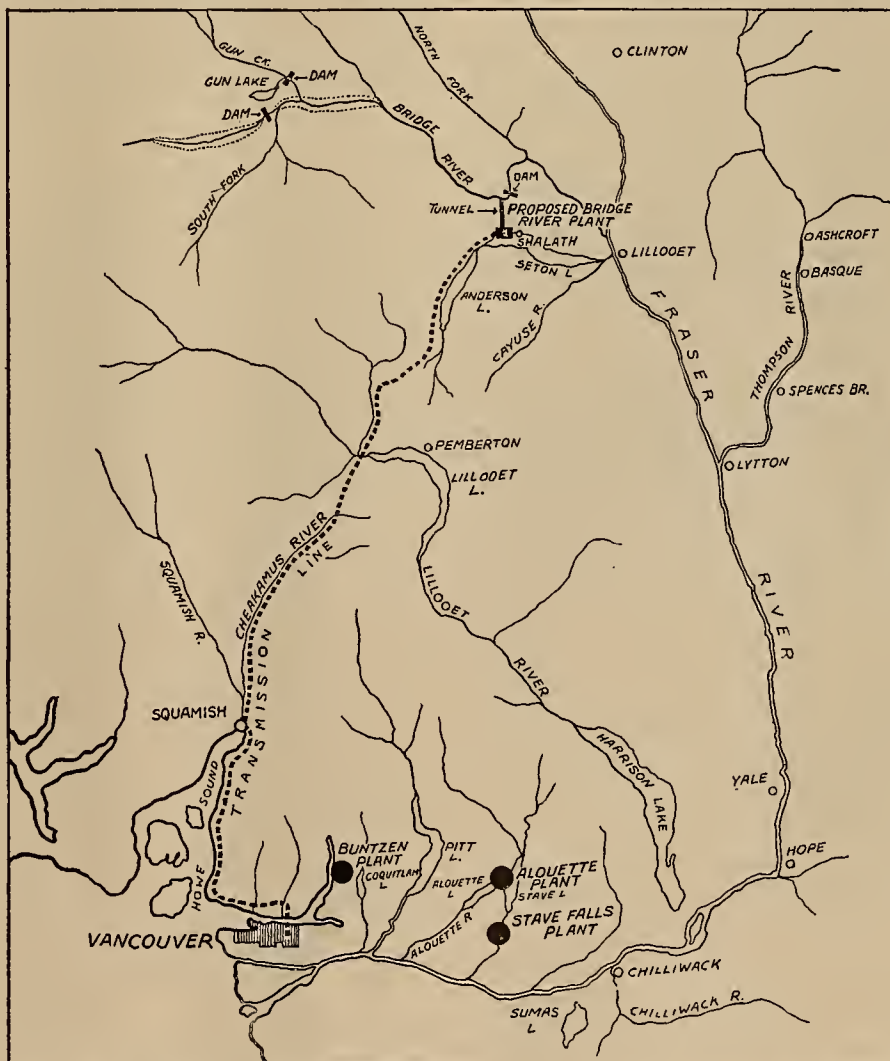
The proposed development is so great, being one of the largest hydroelectric projects in the world, that only the first stage, producing 157,500 kva., has been planned. There is believed to be power in Bridge River sufficient for the needs of Vancouver and the lower mainland of British Columbia for forty to fifty years.

Originally in the hands of W. R. Bonnycastle, consulting engineer, Vancouver, the Bridge River power rights latterly have been held by a Montreal syndicate, the majority of whose stock

was held by the Royal Securities Corporation, H. H. Vaughan and Henry Holgate of Montreal. A year and a half ago the British Columbia Electric Railway Company obtained an option on the property and since then has been making extensive investigations and tests. The whole scheme has been reported upon extensively by J. D. Galloway, consulting engineer, San Francisco.

At the present rate of progress, additional power will be required for Vancouver and vicinity by 1930. If this rate is maintained construction must start in 1927.

The Bridge River project consists of diverting the river through a 2½-mile tunnel into Seton Lake, which is located 135 miles north of Vancouver. By a fortunate trick of nature, this river with an available flow of 3,500 sec.ft., has been brought within two and a half miles of Seton Lake, but at a point 1,200 ft. above it. So great is



Map showing the site of the proposed Bridge River power development to be undertaken by the British Columbia Electric Railway Company that is estimated to insure Vancouver an ample supply of power for the next forty years. The Stave Falls and Alouette plants of the company are shown in respect to the location of the Bridge River project and to Vancouver itself

the development, however, that heretofore it has not been economical to utilize it, owing to the heavy initial costs. It has remained for more favorable power sites closer to Vancouver to be developed first. The British Columbia Electric system is now large enough to absorb the initial stages of power production.

In the first program, which will produce 157,500 kva., there will be four stages. The first stage will develop 45,000 kva. at a cost of \$13,271,000. This cost will include the tunnel, a diversion dam across Bridge River, the power house and two units of 22,500 kva. each and a dam at Gun Lake providing 50,000 acre-ft. of storage. The water of Gun Creek will be diverted by means of a flume and ditch into this lake. There will be a 135-mile wood pole transmission line, operating at 165,000 volts.

The second stage will consist of installing a third impulse wheel and generator, bringing the capacity up to 67,500 kva. At the present rate of progress, this will be required in 1933 and will bring the total cost up to \$14,700,000.

The third stage will develop a total of 112,500 kva. in five units at a total cost of \$28,000,000. At this stage a dam will be built at La Joie Falls, forming what is known as the upper basin and impounding 350,000 acre-ft. A second transmission line on steel towers will be built at this stage.

The fourth stage will develop 157,500 kva. at a total cost of \$30,500,000 by the installation of two more units. In further stages the lower basin will be developed for bringing the storage up to 1,700,000 acre-ft. This, however, is so far in the future that details have not been worked out.

The power plant will operate under a head of 1,217 ft. during the first part of the scheme, and when the lower basin is created the head will be increased to 1,350 ft.

It is the plan of the British Columbia Electric Railway Company to proceed with the first two stages, developing 57,500 kva. at Bridge River by 1933. The next stage probably will take place at Ruskin on Stave River, where there is an available capacity of 90,000 kva. Of this 45,000 kva. can be developed for \$8,000,000 as against \$13,000,000 for the third stage at Bridge River. This will postpone the third stage at Bridge until this additional power from Stave is utilized.

The present capacity of the British Columbia Electric Railway Company's plants is approximately 453,000,000 kw-hr. annually. The output of these plants during 1924 was 300,000,000 kw-hr. At an increase of 10 per cent per annum this power will suffice only until 1930, allowing for the dropping of the Bellingham load next April with the completion of the Puget Sound Power & Light Company's Baker River plant. The Bridge River project will be capable of producing 2,700,000,000 kw-hr. a year.

Bridge River was chosen after extensive investigations of other power sites. Its development will dispose of the necessity of looking for further power for a generation. Plans are being drawn in detail by the company's consulting engineer, E. E. Carpenter. The power house will be located on the Pacific Great Eastern Railway.

Pacific Coast Industrial Lighting Organization and Meeting Schedule Announced

With a completed organization and a schedule of meeting dates fast shaping into form, the Industrial Lighting Activity for the Pacific Coast Geographic Division is getting under full head, according to A. M. Frost, sales manager, San Joaquin Light & Power Corporation, Pacific Coast geographic chairman. Only a few dates remain to be determined for the completion of the speaking program for the educational side of the activity.

The schedule, at last reports, had arranged for the following meetings:

Oakland—Oct. 5, H. H. Robinson, Pacific Gas and Electric Company, speaker.

Fresno—Oct. 14, Morris Hixon, Edison Lamp Works, speaker.

Bakersfield—Oct. 15, Morris Hixon, speaker.

San Jose—Oct. 17, Morris Hixon, speaker.

Stockton—Oct. 20, Robert Prussia, Westinghouse Lamp Company, speaker.

Meetings are to be held, according to the announced plans of G. M. Rankin, field representative of the California Electrical Bureau, and assistant to A. M. Frost, at the following cities: Sacramento, Stockton, Oakland, San Jose, San Francisco, Fresno, Bakersfield, San Luis Obispo, Los Angeles, Riverside, San Bernardino, Long Beach, Santa Ana and San Diego, Calif.

Each of these meetings is to be of an educational nature, the speaker in each

case to be a member of the educational committee. The program is intended for the instruction of central-station salesmen, jobber salesmen, contractors, and manufacturers' representatives, in the rudiments of industrial lighting practice so that they can go forth and sell better lighting in an intelligent manner.

A list of the vice-chairmen who will assist A. M. Frost in conducting the Industrial Lighting Activity in the Pacific Coast Geographic Division was published in the Journal of Electricity Sept. 15, p. 227.

Under the chairmanship of Clark Baker, National Lamp Works, the following men have been named on the educational committee to act as speakers for the educational meetings: D. Pence, Illinois Electric Company; C. O. Martin, Benjamin Electric Manufacturing Company; F. Van Gilluwe, C. W. Cole & Company; Robert Prussia, Westinghouse Lamp Company; C. A. Sanborn, Holmes & Sanborn; M. Hixon, Edison Lamp Works; T. F. McDonough, Benjamin Electric Manufacturing Company; H. C. Barnard, Curtis Lighting, Inc.; W. A. Alden, Westinghouse Electric & Manufacturing Company; H. H. Robinson, Pacific Gas and Electric Company, and L. Hobbs, Edwin Guth Company.

Feather River Holdings Acquired by Byllesby Interests

Extensive power holdings on the Middle Fork of the Feather River were acquired from the Feather River Power Company in a recent deal by H. M. Byllesby & Company, it was announced recently by officials of the Feather River Power Company. The deal, however, does not affect the \$8,000,000 program of the Feather River Power Company for the construction of its Buck's Creek plant, located on a tributary to the North Fork of the Feather River.

It is understood that the Byllesby company will begin the construction of a 90,000-hp. hydroelectric plant on the Bean Creek tributary to the Middle Fork of the Feather River in the spring of 1926. Power will be transmitted from this plant to the Western States Gas & Electric Company at Stockton by means of a 165-kv. transmission line.

The Middle Fork Feather River holdings acquired by the Byllesby interests are reported to have been purchased from Karl Brehme, president of the Feather River Power Company, Lars Jorgensen, vice-president, and two members of the construction firm of R. C. Storrie & Company of San Francisco.

The Feather River Power Company's \$8,000,000 power project on the North Fork tributary, at Buck's Creek, however, is to go on uninterrupted or unaffected by this deal. In the latter project, for the construction of a 60,000-hp. hydroelectric plant at Buck's Creek, the entire output has been contracted to the Great Western Power Company at 4 mills per kw-hr. for a period of thirty-five years, at the end of which time the

plant will become the property of the Great Western Power Company in consideration of the price paid for the energy. (Journal of Electricity, Oct. 1, 1925, p. 265.) This plant is scheduled to go into operation about October, 1927.

A feature of the Buck's Creek plant of the Feather River Power Company is the plan to utilize a 2,580-ft. drop, claimed to be the highest in the world, exceeding by 100 feet that of the Balch plant of the San Joaquin Light & Power Corporation now under construction. (Journal of Electricity, April 1, 1925, p. 241.)

Grant Permit for Thurston County Development in Washington

Permits to appropriate 31 sec.ft. of water from springs in eastern Thurston County for use in connection with development of a \$1,000,000 power, irrigation and domestic water supply project recently were issued J. C. Sams, 212 East Fifth Street, Olympia, by R. K. Tiffany, state supervisor of hydraulics.

The first permit covers appropriation of 25 sec. ft. of water from McAllister Springs. A pipe line 15 miles long is contemplated. Cost of this project is estimated at \$750,000. The second permit is for 6 sec.ft. of water from Beatty Springs. A pipe line eight miles in length is proposed. Cost of this project is estimated at \$250,000. Applications for both permits were filed by Sams June 24, 1925. Details of the pumping plant, reservoir and pipe line are to be furnished later. Construction must begin by July 1, 1926, and be completed by Jan. 1, 1928.

Irrigation District License Ends Long Controversy

A four-year controversy as to the rights for water and power development on the Yuba River in Nevada County, Calif., was settled by the Federal Power Commission recently in granting to the Nevada Irrigation District the rights to proceed with its plans for a 200,000-acre irrigation scheme. The Yuba River Power Company contested the application, as did the Excelsior Water & Power Company. The Excelsior Water & Power Company's claims had been disposed of previous to the license grant, due to purchase of the Excelsior system by the irrigation district. F. H. Tibbetts, chief engineer of the Nevada Irrigation District project, and A. L. Wisker, general manager, announced that work would start immediately on the first part of the development, to cost \$2,000,000.

The district, which lies within Nevada County, adjacent to Grass Valley and Nevada City, has conducted a campaign for four years to obtain water and power rights on the Yuba River. The district has a contract to allow the Pacific Gas and Electric Company the use of the water for power-generation purposes between the dams of the district and the land to be irrigated. These arrangements were contested by the Yuba River Power Company, which claimed that more efficient use of the water were to the North Yuba rather than the South Yuba, and through the plants of the Pacific Gas and Electric Company.

In its hearings the Federal Power Commission tried to determine whether or not the watershed of the Yuba River is an essential part of the irrigation district or if it is only something it would like to have to use to its advantage. It was apparent that the commission was not entirely convinced that the irrigation district would use the water for anything other than the generation of power. The irrigation district had to establish that the water is essential to a feasible irrigation project, with power development an incident to that use. As the matter stood for some time the commission was in doubt and felt that it must discharge the responsibility vested in it to approve only the most efficient use of water resources.

W. F. McClure, the chief of the Department of Public Works of California, appeared in behalf of the Nevada Irrigation District. He urged that the license be issued in view of the fact that state rights had been secured and a bond issue approved by the state authorities. The appearance of Mr. McClure in such a capacity was objected to strongly by the representatives of the Yuba River Power Company. They contended that it is improper for state authorities to participate in the case after they had passed upon priority in the matter of water rights and the ability of the applicants to guarantee their bonds.

Prof. C. F. Shaw, of the University of California, testified as to the agricultural value of the soil in the Nevada district. The Yuba company took issue with his findings and pointed out that previous attempts to conduct irrigation projects on these lands had been unsuccessful ventures.

Judge C. W. Slack appeared on be-

half of the Yuba Consolidated Gold Mines and the irrigation interests on the lower Yuba. Those irrigators claimed that the issuance of a license to the Nevada Irrigation District would interfere with their water supply. With the representatives of the Yuba River Power Company he took the position that "the only question to determine is whether to give a license to a good power project or to a poor power project masquerading under a cloak of irrigation."

Spokane Women Meet to Organize Sectional Committee

That the women of the light and power industry can be of great assistance to the activities of the public relations department of the company; that they will benefit directly from this work through self-improvement, and that their participation at meetings of women throughout the territory will be a benefit both to the company and the community, were three important points stressed at the first meeting of the women's organization of The Washington Water Power Company, Spokane, Sept. 18, 1925. This organization was formed as a section of the Women's Committee of the Northwest Electric Light and Power Association, a subcommittee of the Public Relations Section. Members of the executive committee of the Spokane organization include: Mary K. Walsh, chairman; Mrs. Louise Bree, vice-chairman; Pauline Strom, Lettie Hedger, Ruth Coombes, Emma Marlowe, Ruth Roland, Mrs. J. B. Fiskien and Mrs. C. V. Aspinwall.

The first meeting was addressed by Lewis A. Lewis, sales manager of the company, and president of the Northwest Electric Light and Power Association; by W. H. Ude, director of public relations of the company, and chairman of the Public Relations section of the association; and by J. E. E. Royer, assistant general manager of the company. A general discussion led by Miss Walsh followed.

A.I.E.E. San Francisco Section Meet.—The San Francisco Section, A.I.E.E., will hold its next regular meeting Oct. 30 at the new factory of the Pacific Electric Manufacturing Company at 5815 Third Street, San Francisco. The Section will be the guests of the company upon this occasion.

A.I.E.E., Vancouver, B. C., Section holds next regular meeting Nov. 3, 8:15 p.m., 913 Metropolitan Bldg., 837 Hastings Street, West. Subject, "Power Factor Correction." Speaker, R. L. Hall, Engineering Department, B. C. Electric Railway Company.

Pacific States Company Opens New Oakland Warehouse and Office.—Announcement of the opening of new offices and warehouse for the Pacific States Electric Company at Oakland was made recently by officers of that company. The new branch offices and warehouse are at 204 Ninth Street, Oakland, Calif. and were opened for business Sept. 8. "Enlarged quarters for our Oakland branch were made necessary by the unparalleled growth of Oakland and surrounding communities and in planning these new quarters the future requirements of East Bay customers have been anticipated," the official announcement states.

California Utility Issues Book on Farm Electrification

"Pioneers in Farm Electrification" is the title of a booklet recently prepared and published by the Pacific Gas and Electric Company, San Francisco, to show the progress made in electrifying the California farm and the part played by the company in that work.

Starting with what was probably the first agricultural installation in California, near Marysville in 1900, the booklet traces the early steps in the development, tells of experiments with electric pumping in irrigation districts, with the use of electric milking machines in dairies, with electric cooking and water heating on the farm and gives the basis of early rates and installation charges. It describes a demonstration car containing sample equipment for farm use shown in actual operation that was run in connection with a University of California farm extension train and used to spread the gospel of the possibilities of electricity on the farm.

The use of electricity in the poultry industry, in the dehydration of fruit and vegetables, and in the heating of green houses are other phases touched upon, and reference is made to the experiments being carried on in connection with the dehydration of walnuts, in orchard spraying and in heating orchards during frost conditions, in all of which the power company has been an active cooperating factor. Other subjects treated include reclamation by electric pumping, the present use of electricity on the farm, low cost to the farmer, the research work planned under the supervision of the California Committee on the Relation of Electricity to Agriculture, in which the power company is taking an active part, and the company's advisory service.

The booklet is very fully illustrated. The inside front cover contains a tabulation of salient facts about California farms, and the inside back cover data for figuring the horsepower required by centrifugal pumps.

Senate Committee on Public Lands to Hold Hearing on Colorado River.—Various questions relative to the development of the Colorado River are expected to be discussed before the Senate committee on public lands, which is to hold a hearing on the subject in Los Angeles Oct. 26, 1925. Facts brought out at the hearing will be presented by the committee at the next session of Congress.

Payson, Utah, Lets Street-Lighting Contract.—Contract for the installation of the new whiteway lighting system in Payson, Utah, has been awarded to Frank Coombs, Salt Lake City electrician. Work will be begun immediately.

Want Underground Conduit for Street Lights and Services in Pasadena District.—Petition for the organization of a district for the improvement of Walnut Street between North Lake Avenue and North Fair Oaks Avenue, Pasadena, was referred recently by the board of city directors to R. V. Orbison, city manager. The petitioners ask that a concrete pavement be installed, culverts put in, and conduits provided for underground service through conduits and for an ornamental lighting system.



News of the Electragists



Inspectors Discuss Standardization and Uniform Interpretation of Rules

Standardization of rules covering safe electrical installations and their uniform interpretation was the keynote of the discussions before the fourth semi-annual convention of the California Association of Electrical Inspectors which was held in Fresno, Sept. 24-26. Grounding of portable appliances, construction and installation of electric signs, uniform electrical ordinances, and the National Electrical Code also were considered during the sessions, which were held in the San Joaquin Power Building. R. W. Abright of Long Beach presided over the convention, which was attended by forty-five persons representing nineteen different municipalities.

Inspection in suburban districts was one of the first subjects brought before the convention. Progress on this subject was reported by several of the delegates.

Grounding of portable appliances was discussed at considerable length, various methods and ideas being presented, including the placing of a ground lug upon the device and the use of 3-wire portable cord with a polarized plug connected to ground. Most of the members were of the opinion that effective grounding of portable appliances was highly desirable but felt that most of the remedies suggested were impractical. It was suggested that a suitable plug and receptacle should be attached to these devices by the manufacturer; this would enable contractors and inspectors to impress more favorably upon the owner the necessity for that kind of plug. It generally was felt that education of the public to the hazards that arise in improperly grounded installations would do a great deal to remedy the situation.

R. J. Larrabee of the Underwriters' Laboratories explained the methods of identification of cables approved by them. President Abright urged the members to insist on the use of mater-



President R. W. Abright, from Long Beach

ials and appliances which are approved by the Underwriters' Laboratories.

A committee to act in an advisory capacity to the framers of the National Electrical Code was appointed from the Association. This committee will receive and edit suggested rules to be incorporated in the Code and will forward them to the electrical committee of the National Fire Protection Association. Anyone may send suggestions to this committee, which is made up of the following members: F. Morrell,

Stockton, northern division; H. W. Stitt, Fresno, central division; and R. W. Abright, Long Beach, southern division.

Proper construction and installation of electric signs were discussed at considerable length. It was found that many cities were requiring that the provisions of the National Electrical Code



George Kimball, Industrial Accident Commission, San Francisco; H. W. Stitt, Fresno, past president

and the Safety Orders of the Industrial Accident Commission be adhered to, despite many rumors to the contrary. It was the unanimous opinion of the delegates that all cities should enforce the requirements of the Code and the Safety Orders on all sign installations.

The tentative regulations of the Board of Fire Underwriters of the Pacific relative to electrical equipment and wiring of theaters and motion picture establishments were presented to the members for their suggestions and approval. These were outlined by J. M. Evans of the Underwriters.

The Red Seal Plan of adequate wiring was outlined by Victor W. Hartley, executive secretary of the California Electrical Bureau, and copies of the Red Seal specifications were given to the members who manifested a keen interest in the subject.

The work of the California Electragists was presented by George Eldridge, field man for the northern division of that organization. He assured the inspectors of the co-operation of the Electragists in their work.

The question of making the meetings of the Association annual instead of semi-annual was discussed. This will be decided at the next meeting of the organization, which will be held in San Diego in March.

Uniform Ordinance Considered

President Abright introduced the subject of a uniform ordinance for all cities and urged that steps be taken to bring this about. Carl Beaton of Sacramento suggested that the National Electrical Code and the State Safety Orders be the basis of this ordinance with only a few additions to meet unusual local conditions. After considerable discussion from the floor it was decided that a committee should be appointed to work on the problem of standardization of local ordinances. This committee is to draft an ordinance which will embody necessary addenda to the National Electrical Code and Safety Orders for local adoption. In order that the members of the committee may be able to meet it was divided into a group from the north and one from the south. The northern division will be headed by B. C. Hill, Oakland; K. J. Bickel, Martinez; and W. Scott, Burlingame. H. N. Beecher, Los Angeles, is chairman of the southern committee; G. N. Fording, Anaheim; and R. W. Abright, Long Beach.



Northern and southern California declare a truce! From left to right—Ralph Wiley, San Francisco; R. H. Manahan, Los Angeles; B. C. Hill, Oakland; and H. N. Beecher, Los Angeles.

Trade Policy Important Topic at A.E.I. Convention

The trade policy of the association, the National Electrical Code, and estimating were three of the most important subjects brought up for discussion at the twenty-fifth annual convention of the Association of Electragists International, which was held at West Baden Springs Hotel, West Baden, Ind., Sept. 22-26.

The opening address of the convention was given by Joseph A. Fowler, president, Association of Electragists, International, who outlined the progress which had been made during the last year in telling the trade policy of the Association to various national organizations in the industry.

"The Strategic Position and Duties of the Electragists," was the subject of an address by Hon. J. H. Trumbull, Governor of Connecticut, president of The Trumbull Electric Manufacturing Company, Plainville, Conn., and formerly an electrical contractor.

O. Fred Rost, president, Newark Electrical Supply Company, Newark, N. J., gave an address on the Electragist's trade policy in practice.

The trade policy committee's report was given at an executive session of electragists only. This report was one of the most constructive presented at the convention.

A. Penn Denton, chairman of the code committee, gave its report at a conference of local code committees.

"Moral Responsibility of Electrical Dealers to the Public," was the subject of an address by Martin L. Pierce, director of research, The Hoover Company, North Canton, Ohio.

William S. Boyd, secretary and treasurer of the Western Association of Electrical Inspectors, Chicago, delivered an address on the electrical inspector and outlined the work of that association.

One of the features of the technical session under Arthur L. Abbott, technical director, A. E. I., was a demonstration given by C. J. Geisbush, executive secretary of the Southern Division of the California Electragists, in which he showed those present how proper scientific estimating was sold to the Electragists in southern California. This was received very enthusiastically by the meeting.

The manufacturers' exhibit was one of the most complete ones that ever has been provided, forty-four electrical manufacturers being represented. They already have decided to exhibit again next year at the convention which will be held at the West Baden Springs Hotel.

Four certificates of honorable mention under the James H. McGraw award were presented by Earl E. Whitehorne, commercial editor of Electrical World, to A. Penn Denton of Kansas City, Robert A. Goeler of New York, Walter H. Taverner of New York, and William J. Ball of Moline, Ill., in recognition of services rendered to the electrical contractor-dealer group of the industry.

Molner Brothers have opened a new electric store at 5114 York Boulevard, Los Angeles, under that name and will stock a complete line of appliances in addition to conducting general electrical contracting. A. D. and S. Molner are the owners.

Chico Electric Supply Company, Chico, Calif., recently have become affiliated with the California Electragists.

Ernest Smith's Electric Store recently moved into a more convenient location at 107 West Broadway, Hawthorne, Calif.

McLellan Electrical Shop and Reinharts Electric, both of Ferndale, Calif., recently have become members of the California Electragists.

J. H. Hilfiker, electragist of Eureka, Calif., was a recent visitor in San Francisco. He is one of the owners of the Eureka Electric Company.

H. W. Collins has opened The Service Electric Company at 3222 E. Broadway, Long Beach. He formerly was at 235 Grand Avenue in that city.

The Commercial Electric Company, electragists of Oakland, Calif., recently moved from 498 Twenty-first Street to 5934 San Pablo Avenue in that city.

G. W. Nelson recently has opened a new electrical contracting establishment in Lancaster, Calif. Mr. Nelson was formerly in the illuminated sign department of Foster & Kleiser Company, Los Angeles.

The Albert Sechrist Manufacturing Company of Denver, Colo., has been awarded the contract for lighting fixtures in the new \$2,000,000 East High School in that city.

The Keystone Electric Company has moved into a new location at 1650 West Washington Street, Los Angeles. L. A. Walterwest, the proprietor, specializes in electrical contracting.

Arthur P. Peterson, field representative of the Association of Electragists, International, was a recent visitor in Salt Lake City, where he addressed a meeting of contractors and dealers.

Henry Laurdeaux recently purchased Ye Electric Shop at Sonoma and is operating it under the name of the Sonoma Electric Shop. Mr. Laurdeaux formerly was located in San Francisco.

K. S. Scott has opened a store at the corner of 8th and F. Street, San Diego, under the name of the Scott Electric Company. He will have a fixture, motor and appliance, and engineering department.

Walter L. Paine, Santa Cruz electragist, recently completed the electrical installation in the Session Building in that city that will house a business college, apartments, garage, stores and a dance hall.

The Wade Electric Company, 121½ South Pacific Avenue, Redondo Beach, Calif., is now owned and operated by H. C. Wade. Mr. Wade was formerly a partner of B. Moore in the M & W Electric Company.

L. C. Miller, formerly manager of the Apex-Rotarex department of the Illinois Electric Company, Los Angeles, has resigned to enter business for himself. He is featuring the display of Apex and Rotare appliances.

Philip Mayer and W. G. Boyce, of San Diego, recently have moved into new and enlarged quarters. Formerly known as the Philip Mayer Company, this firm of electragists now will be operated as Mayer and Boyce.

E. G. Osterhoudt, radio electrician, and V. E. Harvlie, electrical contractor, recently have opened a joint store at 1522 East Manchester Avenue, Los Angeles, under the name of the Manchester Radio Electric Shop. They formerly operated a store at 1909 East Nadeau Street.

H. F. Hart recently opened the Sunset Radio and Electric Company at 637 Irving Street, San Francisco.

The Old San Francisco Electric Company has moved into a new store at 635 38th Avenue. The concern was formerly at 1145 Lake Street, San Francisco.

The American Automatic Appliance Company has been granted a contractor's license in Denver. McDonald and Solomon are the proprietors of the new firm, which has headquarters at 2351 Fairfax Street.

J. M. Evans recently resigned his position as city electrician of Modesto, to become affiliated with the Department of Public Works, Division of Architecture of the State of California. His headquarters will be in Sacramento.

Carl Lagerfelt recently opened an electric store in the West Coast Theater Building, Los Angeles, under the firm name of the Standard Electric Service Company. Mr. Lagerfelt has embodied a number of modern features of stock display and arrangement.

The Graveline Electric Company, formerly of Englewood, Colo., and more recently associated with the Electric Supply & Construction Company of Denver, is now operating as an independent contracting firm in Denver at 919 East Alameda Avenue.

E. C. Headrick, mountain division committeeman, Charles N. Shannon, also a prominent electragist, and B. C. Watts, a jobber, made up the Denver contingent at the annual convention of the Association of Electragists, International, at West Baden, Ind.

T. A. Alexander has purchased the interest of R. A. Parsons, and is now the sole proprietor of R. A. Parsons & Company of Porterville, Calif. Mr. Alexander will continue to operate under the same firm name and at the same location, 524 Main Street, Porterville.

James C. Kerr, of the Electric Supply Company, Manteca, Calif., has moved to a new location next to the offices of the Pacific Gas and Electric Company. He has a much larger store with good windows, and a large well lighted shop where he will continue to conduct his rewinding and repair business.

R. S. Willoughby, prominent electrical contractor of Denver, Colo., recently has established a jobbing house in that city and also has announced himself as the owner of the Wesco Company. Mr. Willoughby has engaged W. W. McFarland, formerly of Denver, although more recently engaged in the electrical business in California, as manager of the agency.

G. A. Sechler, contractor-dealer of Denver, Colo., recently purchased the stock of the Poindexter Electric Supply Company of that city, which was sold on a court order following the recent death of Mr. Poindexter. Mr. Sechler was the highest bidder for the stock. It is understood that a retail business will be conducted from the old location at 1625 Tremont Street.

Goodknight & McFarland, operators of an auto service station, battery shop and tire department, now have added a complete line of electrical appliances and supplies. They will conduct a regular electrical contracting and supply store. To permit greater display space they have leased the store adjoining the present one and will occupy 3942 and 3940 S. Western Avenue.

Pacific Coast Electrical Association

Technical Section Holds Initial Meeting of Fiscal Year in Los Angeles

Off to a flying start on the work of the present fiscal year, the Technical Section of the Pacific Coast Electrical Association held its first conclave of the year in the Los Angeles Gas & Electric Company's new building in Los Angeles, Sept. 23-25. With at least 90 per cent of the organization work already completed, all of the committees were able to make progress reports at this meeting and only a minimum amount of time was given over to perfecting the organization of committees and subcommittees. This desirable and pleasingly healthy state of affairs as exhibited at this, the first series of meetings of the year, foretells an immensely productive year for the Technical Section.

In addition to the technical sessions there were three special meetings. The first of these was the meeting of the executive committee held the evening of the first day. At this meeting each committee chairman outlined the completed and proposed work of his committee. In this way all were advised of the work undertaken or to be undertaken by the other committees. This interchange of information made possible the formation of joint subcommittees for the study of subjects in which more than one committee was interested. Routine business matters of the section also were attended to. Chief of these was the acceptance of the report of the overhead systems committee of last year covering the suggested revisions of General Order 64 of the California Railroad Commission. This report was ordered passed on through the proper channels to the commission as the official suggestions of the Technical Section.

The second of these special meetings was a luncheon meeting held at noon the second day.

This meeting was attended by all of the delegates to the meetings as well as by others interested in the work. Each committee chairman thoroughly outlined the work, present and proposed, of his committee, thus giving everyone an idea of the whole scope of the subjects under consideration by the various committees. In addition to this Professor Sorensen of California Institute of Technology gave an interesting discourse into which he wove something of a review of the recent A.I.E.E. convention and a discussion of some of the work under way at his institution.

The third special meeting was that of the executive committee held the evening of the third day. At this meeting the finishing touches were added to the activities of the conclave and the way paved for the January meeting to be held in San Francisco. Vice-chairmen were selected for each of the committees, and these will be announced through the Journal of Electricity as soon as the appointments have been confirmed.

A summary of the activities of the committees at the Los Angeles meetings is given in the following paragraphs. In this, no attempt has been made to cover fully all of the work of the committees, but rather to give a comprehensive idea of the scope and importance of this work as well as of the progress made.

Electrical Apparatus Committee

J. C. GAYLORD, Chairman

G. A. FLEMING, Secretary

Southern California Edison Company,
Los Angeles

Topics as laid out for study and discussion at the three meetings of the year are as follows:

1. Pacific Coast Practice in Transmission and Distribution Substations. This is the major subject.
2. Tests of Station Grounds.
3. Oil Circuit Breakers.
4. Transformer Voltages.
5. Relays and Relay Applications.
6. Lightning Arresters.
7. Right Tension Fuses.

The meetings were of unusual interest, and over one hundred members and visitors registered.

Design features of new substations in San Francisco, Los Angeles and San Diego were described ably in talks by S. J. Lisberger, K. B. Ayres, H. L. Sampson and G. A. Fleming. Two of these were illustrated by lantern slides. The papers showed the wide divergence in the types of stations needed for city and rural service and the necessity of considering the type of load and its possible increase when designing new stations.

Architectural features and the abatement of noises from city stations are receiving a great deal of attention. A simple, cheap and easily rebuilt station is necessary for a rapidly growing rural service. The Southern California Edison Company has standardized upon several small stations for rural use. The smallest was described, and the method of handling the design and construction on a ready-cut basis shown.

Discussion on station electrical grounds brought out the necessity of good contact for rods or plates that are expected to provide a ground. Tests made by E. R. Stauffacher and N. B. Hinson of the Southern California Edison Company and H. N. Kalb of the San Joaquin Light & Power Corporation indicate that the ground resistance from a broken live wire to the substation is likely to be quite high. It varies with the resistance of the earth on which the wire lies, and on 4-kv. grounded star systems usually is too high to give enough current to operate an overload relay.

The use of transformer oil in oil circuit breakers was discussed and the fact

brought out that it often is used indiscriminately with switch oil in the lower-voltage classes. One of the large manufacturers apparently sanctions the practice, while another condemns it.

Reports on the operation of oil circuit breakers under operating conditions were made by R. C. Denny of the San Joaquin Light & Power Corporation and E. R. Stauffacher of the Southern California Edison Company.

A great deal of interest was shown in recent developments in relay connections involving under-voltage features as well as overload. C. E. Schnell of the San Joaquin Light & Power Corporation read a paper on the subject, and E. R. Stauffacher described the application of voltage relays to the Southern California Edison Company's system to separate it into self-sustaining units in times of trouble.

Accident Prevention Committee

J. M. BUSWELL, Chairman

San Joaquin Light & Power Corporation, Fresno

In discussing the subject of safe practices and their enforcement among those engaged in electrical work it was suggested that there should be severe penalty such as a lay-off or actual discharge for workmen or foremen who violate safety rules. Attention was called to the fact that some companies have given much thought to safe line work but little consideration to work inside of stations. Arising from a discussion of this subject were several good suggestions regarding safe practices. Definite requirements for the procedure of obtaining clearance in order to do work on electrical apparatus in stations were recommended. Also it was recommended that permanent grounding points be supplied in stations so as to eliminate the hazard attending the application of grounding cables indiscriminately on any handy metal. A need was expressed for some instrument or method or device for testing the potential on a conductor before applying grounding cable. Certain definite recommendations were made regarding the testing of underground cables to ascertain whether energized or not, prior to doing work on them. For overhead work it was suggested either that a railing be provided on platforms or that safety belts and straps be required absolutely of the workers. That all men working in close proximity to, as well as around, any high-voltage conductor or equipment must in all cases be accompanied by another first-class man, was suggested as a desirable rule. Also it was thought that all engineers and purchasing departments should include in specifications for machinery and equipment provisions that proper derricks and safety appliances be provided.

A tool or some testing device for ascertaining the potential on a conductor or piece of equipment before grounding it was considered essential. Considering the danger incident to the use of gasoline blow torches and blow pipes, these have been displaced largely by the use of acetylene torches and small hand-operated torches. As regards the subject of accident statistics, it was pointed out that a complete statistical record would enable the general accident prevention committee and the department particularly responsible for accident prevention and safety instructions to watch the company's experience and

concentrate efforts on those places where accidents are noted in larger numbers. The particular points of such a study are: Types of accidents classified as to cause; character of injury; method of protection; and department or district in which accident occurred. The posting of bulletins containing accident statistics would do much to engender public interest in accident prevention. A comprehensive report upon this subject was requested by the committee. Educational work is regarded rightfully as one of the most important features in satisfactory accident prevention, and much discussion centered around this point. The use of safety instructors by the various companies was considered as an essential step in the safety-first program, and further it was decided to be desirable that these instructors should be capable men from the ranks who would be in a position to know how best to place the program before their constituents. Perhaps one of the most important features of the committee's contemplated activities is the preparation of a uniform and rather extensive safety code from which various member companies could draw the material for the safety codes they wish to provide for their own employees. It was agreed that it was highly desirable that each company should have such a safety code. Further, it was suggested that penalties should be imposed for the violation of provisions of these safety codes. Other subjects to which the committee gave consideration were: Apparatus and Devices, Safety Bulletins, Lighting, and The Foreman.

Hydraulic Power Committee

WALTER DREYER, Chairman
Pacific Gas and Electric Company, San Francisco

Evaporation and percolation losses in storage reservoirs was the first and one of the most important subjects considered by this committee. Study of this subject is being conducted by M. W. Cummings of the California Institute of Technology. It is Mr. Cummings' theory that water is evaporated from reservoirs due to the energy available to evaporate without regard to humidity and atmospheric conditions. The principal source of energy is the sun, but other possible sources are the wind, the earth itself and others of questionable value. The largest problem in this investigation is that of determining the magnitude of these various sources of evaporating power. A special instrument for this purpose has been purchased by the P.C.E.A. for Mr. Cummings' use and soon will be in operation. Some definite data on the subject are expected by some time next spring.

Penstock expansion joint design aroused much discussion. Details regarding the latest practice of several power companies, as well as information from manufacturers, are to be gathered by the subcommittee on this subject. Information regarding the various practices of penstock painting is to be gathered together and forwarded to national subcommittee No. 10 along with information on expansion joints.

Silt deposits and vegetal growth in conduits are two subjects that are also under consideration, and concerning which information is being gathered. A study of specifications for welded and seamless pipe is to be made, and definite information on this subject is expected to be available for the January meeting.

Another vitally important subject is

the effect of speed regulation and water hammer on the design of relief valves, surge chambers and penstocks. This subject elicited much discussion on the part of those in attendance at the meeting. Various possible methods of measuring hydraulic stresses were discussed. Definite studies along this line are to be pursued during the coming year, and it is hoped that some valuable information will be forthcoming. Last year's subject on mechanical reliability of hydroelectric units will be continued during this year by the committee and a report submitted on the operation of hydroelectric units for the year 1924. This is done primarily because of the expressed interest of the national hydraulic power committee.

Inductive Co-ordination Committee

H. N. KALB, Chairman
San Joaquin Light & Power Corporation, Fresno

The program of this committee for the coming year was outlined. This will consist of routine telephone co-ordination problems, co-operation with the national committee in gathering data on existing and new parallels, and continuation of work on the radio interference problem. After some discussion and later action by the executive committee, the subject of power company communication was added to the list for study.

Under radio interference, data will be gathered on equipment and methods used in detection, educational publicity will be fostered, and classification of radio troubles will be done in co-operation with the national committee.

During the remainder of the Association year all data possible will be secured on the following phases of the power company communication problem:

1. Carrier current (a) on high-tension wires and (b) on present telephone circuits.
2. Space radio on various wave lengths for (a) telegraph and (b) telephone.
3. Protection of wire telephone lines carried on power line poles.

J. O. Binney reported on the N.E.L.A. form, a number of parallels of the Southern California Edison Company lines with those of communication companies. Three of these were rather short to be called parallels under General Order No. 52. Discussion was directed particularly against the placing of a complete barrel in a 900-ft. exposure of a 60-kv. line with a telegraph line at 50-ft. separation.

The 40-mile parallel between the 30-kv. line of the San Joaquin Light & Power Corporation and the toll lines of the Pacific Telephone & Telegraph Company from Kittridge to Yosemite Valley was described by Mr. Kalb. Tests made early in the year indicated (1) that a 150-kva. star-delta transformer bank which replaced a 75-kva. bank of the same kind did not reduce materially the noise on the telephone line; (2) that an open delta bank at the government power house connected to the line was a bad offender; (3) that the telephone line was most free from noise when the neutral was isolated from ground and the delta bank was disconnected. Certain recommendations had been made for the betterment of the communication service based on the results of these tests which, incidentally, formed

part of the work of the Pacific Coast associate group of project committee No. 3 of the joint general committee between the N.E.L.A. and the Bell system.

Radio interference was discussed both in its technical phases and from the public relations standpoint. Nearly all companies are using the super-heterodyne with loop for locating sources of interference. The Southern California Edison Company's set and procedure were described by Mr. Binney. The value of the audibility meter was questioned in the ensuing discussion, as it was thought quite good results can be obtained without it by keeping the amplification down to a minimum.

The methods of handling complaints were described showing that the various companies now have definite plans of procedure.

The importance of publicity was stressed, and it was thought that short articles should appear from time to time bringing out the facts that power companies do not cause all the interference and that they are working actively on their part of the problem.

At the January meeting it is expected that comprehensive information on the new subject of company communication, as well as the other activities of the committee, will be presented.

Meter Committee

R. G. JONES, Chairman
The Southern Sierras Power Company, Riverside

Difficulties arising over the attempts to establish short educational courses for metermen during the year 1925 caused much discussion. It was planned to conduct these courses with the co-operation of the Extension Division of the University of California. However, the lack of appropriation for the work of that organization forestalled the carrying on of this work during this past year. Information was submitted to the committee that the University of Arizona conducts these meter short courses directly under the supervision of the Electrical Engineering Department. After lengthy discussion a special committee was appointed to investigate fully all details relative to the establishment of these meter instructional courses and to render a report at the earliest opportunity. Further investigations are to be made into the subject of meter test periods. Safety rules and test facilities are to be studied further. On the subject of the use of oil in meter bearings, manufacturers are making further investigations and results will be awaited by the committee. A recent report on the subject of maintenance of relays indicates the necessity of continuing the subject, and hence further study will be given. Investigations are being carried on by the Southern California Edison Company regarding the use of certain special current transformers in connection with high-tension metering, and data will be available at an early date. New developments pertaining to meters and metering methods will be followed.

Other subjects touched upon and discussed during the meetings of the meter committee were: Three-Wire versus Two-Wire Meters; the Possible Demand for 6-Terminal 3-Wire Meters; Methods of Placing Numbers on Glass Meter Covers; Temperature Corrections for Standard Test Meters; the Relative Applicability of 5, 7½ and 10-Ampere Watthour Meters; and Inspection and Tests on New Installations.

Overhead Systems Committee

G. A. RILEY, Chairman
Los Angeles Gas and Electric Corporation

Six major subjects are to be considered by this committee during the coming year. These subjects are Distribution Transformer Standardization, Bare Wire for Distribution Lines, Testing High-Voltage Insulators in Service, Revision of Construction Rules and Joint Pole Work, Line Construction Costs, and Grounding Primary and Secondary Lines. For each of these subjects a subcommittee has been appointed. The subcommittee on grounding will work in conjunction with subcommittees on this subject, working under the apparatus committee and the safety rules committee. This particular subcommittee really is part of a joint subcommittee.

One of the most important features of the work of the overhead systems committee during last year was the revision of General Order No. 64 of the Railroad Commission, that was worked out by J. E. Macdonald and his large subcommittee. A report covering seven sections as revised was submitted to and accepted by the overhead systems committee to be forwarded through the proper channels to the railroad commission as embodying the suggestions of this committee covering proposed changes in the order. R. O. Waltham of the railroad commission stated that the Commission was anxious to have these suggestions as soon as possible in order to facilitate its completion of the revision of these rules. It is expected that this work will be completed by the commission by the first of the year.

The matter of standardization of hanger irons for distribution transformers was brought up again. Also some discussion and divergence of opinion arose over the question of standardization of the ratings of fuses. There was much discussion as to whether a fuse should carry a certain rated current or should blow at a certain rated current. The difficulties of using fuse and relay combinations on distribution systems and other systems were discussed. The consensus of opinion seemed to be that a study of the subject should be made and all possible information tabulated in order that intelligent recommendations might be formulated. A joint subcommittee will review this subject, the apparatus committee also being interested. Line construction costs, bare wire for distribution lines, and the grounding of primary and secondary lines all received their share of consideration and are important items in this year's work for these various subcommittees. A good many companies already are using bare wire for both primary and secondary distribution, particularly in rural districts where they find that the construction work is thus much cheaper than with insulated wire. The question of the advisability and necessity or possible necessity of adequate grounding at consumers' premises and other places brought forth the appointment of this subcommittee.

Prime Movers Committee

J. W. ANDREE, Chairman
Southern California Edison Co., Los Angeles

The subjects for study during the coming year for which the committee already has been organized into subcommittees are as follows: Burning of Liquid and Gaseous Fuel, Condensers, Cooling Towers, and Spray Ponds,

Stand-by Plant Design, Heat Balance, and Station Auxiliaries.

Progress reports were made by each subcommittee chairman and a number of interesting points brought up for discussion. Furnace pulsation and various methods of overcoming this evil were discussed. The important operating features which must be considered in the design of stand-by steam plants brought discussion from several well qualified members. Important studies relative to methods of prolonging the life of condensers and the direct effect of condenser life upon plant economy are under way by this subcommittee. A discussion of steam vs. motor drive for generating station auxiliaries arose, and the suggestion was made that a tabulation of operating data and cost of each type would be of value.

In close association with the work of the subcommittee on station auxiliaries is the work of the subcommittee on heat balance. It is possible that these two subcommittees will submit a joint report. An interesting discussion on the heat balance system to be employed with the new 50,000-kw. unit to be installed in the Long Beach steam plant of the Southern California Edison Company was given.

Safety Rules Committee

W. R. FRAMPTON, Chairman
Southern California Edison Company, Los Angeles

There was much discussion concerning the possibility of discontinuing this committee, due to the fact that the electrical safety orders of the Industrial Accident Commission of California now are in print and the work for which the committee primarily was organized now is completed. Under the contention that the completion of the electrical safety orders really was the beginning of the work of the safety rules committee rather than the end of it, all members present voted to continued the activities of the committee indefinitely. It was believed that the study and co-operation of the committee would be necessary to further the full application of these safety orders. Several different possible subjects for study were suggested. Co-operation between the P.C.E.A. and the Electrical Inspectors' Association was suggested to the end that the meetings of these two organizations not be held at the same time. Heretofore these two meetings often have been held at the same time thus making it impossible for those interested in the work of the two organizations to attend the meetings of both. Discussion of the Uniform Electrical Ordinance as recommended by the law department of the Electrical Manufacturers' Council brought about a vote recommending its approval for universal use in incorporated cities. Also it was thought that the application of this ordinance should be extended to cover other than city territory where possible. The chairman recommended that an effort be made to obtain representatives from as many electric service companies as possible to assist in the work of the Electrical Inspectors' Association.

The question of the grounding of consumers' installations is a subject which will be considered jointly by the overhead systems committee, the apparatus committee and the safety rules committee. To this end a joint subcommittee will study the question. Meter-testing facilities being another subject of interest and importance, a subcommittee

was appointed to compile a list of various methods that would be acceptable to the different companies. This was done with a view toward filing with the railroad commission service rules suggestions covering these devices.

Underground Systems Committee

P. E. CHAPMAN, Chairman
Pacific Gas and Electric Company, San Francisco

Activities are under way in the study of all six of the major subjects which this committee is to consider during this year. These subjects are: "Improved Design in Outdoor and Indoor Cable Terminals," Study of Kenotron Testing Set," "Metal Conduits as Used for Underground Laterals," "High-Voltage Underground Cables," "Cement Duct," and "Junction Boxes."

The installation of submarine cable crossing in the Napa Creek at Napa, Calif., by the Great Western Power Company was described in a paper presented by G. H. Hagar of that company. This installation is particularly interesting as it is the highest operating voltage on any submarine cable installation on the Pacific Coast of which there is any record at present. The design and installation of the 44-kv., three-conductor outdoor terminal departs from the usual practice in that most installations of this type are of three single potheads instead of one three-conductor pothead. The use of the Kenotron for the testing of high-voltage cable is applied by the Bureau of Power and Light, Los Angeles, was reported upon interestingly and instructively by C. H. Jenkins of that organization. The Kenotron is coming more and more into favor as a means of testing underground lead-covered cable. The 33-kv., three-conductor lead-covered cable installation now in use in Los Angeles was described by M. O. Bolser of the Power Bureau. A paper on high-voltage cables and suggested changes in the N.E.L.A. cable specifications as presented by G. L. Hill invoked considerable discussion.

Cement duct, its manufacture and installation, was covered completely in a report read before the meeting by H. H. Buell of the Pacific Gas and Electric Company, San Jose. Cement duct has been used in the East for some time, but it is only recently that any installations of size have been completed on the Coast. The purpose of cement duct is to provide better means of dissipating heat. The expense involved in the installation of cement duct and the pulling into this duct of lead-covered cable was covered interestingly in a paper by H. C. Moyer of Oakland. It generally was agreed that lead-covered cable does not pull into cement duct as easily as into other types of duct. Underground junction-box design was commented upon in a paper prepared by H. G. Keesling of the Pacific Gas and Electric Company, Oakland. It is apparent that there is quite a field to be covered in the proper design of underground junction boxes. There is quite a wide difference in the practice followed by the various companies in the installation of underground junction boxes.

The testing of underground cables for heating caused considerable discussion. Two companies are spending much time in making complete tests covering this subject. Some very valuable data along this line will be available by January, and the results obtained are being looked forward to with great interest.

Meetings

Change Publicity Section Name To "Advertising Section"

Rehearsing much that was discussed at meetings of the Publicity Section of the Pacific Coast Electrical Association last year, the first meeting of that Section, held in the Los Angeles Gas & Electric Corporation offices in Los Angeles, Oct. 1, again decided upon certain changes in the functions of the Section from those previously in force. The organization structure, determined upon last year, however, was unchanged.

The decision to change the Section's name to that of "Advertising Section" came after considerable debate and was presented in the form of a resolution to be presented to the Executive Committee of the Association at its next meeting.

To head the Information Bureau of the Section, Fred S. Myrtle, Pacific Gas and Electric Company, San Francisco, was appointed by D. L. Scott, chairman of the Publicity Section. The Better Business Bureau appointment was given to M. W. Scanlon, Westinghouse Electric & Manufacturing Company. The chairmanship of the Bureau of Advertising and Publicity Technique was given to J. Charles Jordan, Pacific Gas and Electric Company.

Appointment of M. W. Scanlon, of the Westinghouse Electric & Manufacturing Company, San Francisco, to become vice-chairman of the Publicity Section, and of C. L. Burgess, Westinghouse Electric & Manufacturing Company, Los Angeles, to become secretary for the Section, followed. The next meeting of the Section was scheduled for San Francisco, just prior to the meeting of the Executive Committee of the Pacific Coast Electrical Association.

A resolution, presented by F. Z. Stone, of The Southern Sierras Power Company, Riverside, Calif., asking for a co-ordinated scheme of advertising and publicity on future government ownership activities, was written into the minutes of the Section. A special committee was appointed by D. L. Scott, chairman of the Section, to report on the resolution and make recommendations. F. Z. Stone was named chairman of this special committee on which Mr. Scott and R. E. Smith also are to act.

Lamp Sale Profits Discussed at League Meeting in Santa Cruz

"Profits from Lamp Sales" was the subject discussed before the members of the Electrical Development League of Monterey Bay territory at one of its recent meetings by Morris Hixon of the Edison Lamp Works, San Francisco. Mr. Hixon stressed the fact that light is inexpensive and should be used freely. He also stated that contractors could use this as an argument in selling higher wattage lamps.

The type of Christmas circulars to be sent out by the members was discussed at some length. One similar to that used last year was finally agreed upon. Walter Cox of Santa Cruz, president of the organization, presided at the meet-

ing, which was held in that city and attended by forty-seven members of the organization.

Seattle Club Golf Tournament Won by T. S. Wood

The golf tournament of the Electric Club of Seattle, which has been under way throughout the summer months, ended recently with T. S. Wood, vice-president of the Electric Club and Northwest representative of the Packard Electric Company, the winner. Mr. Wood, working his way up from the bottom, first defeated Ray Robinson of the Robinson Sales Company, 5 and 4; Mr. Sampson of the Hurley Machine Company, 3 and 2; Dan Chamberlain of the Globe Electric Company, 2 and 1;



T. S. WOOD

Jack Agutter of the J. J. Agutter Electric Company, 1 up; Fred Block of the Pacific States Electric Company, 1 up after 30 holes; Pat Murphy of the General Electric Company, 1 up after 35 holes.

The game with Mr. Murphy was a hard-fought battle, being played over the Inglewood course in a brisk wind on wet greens. The trophy won, a cup, was donated by Harry J. Martin, for two years president of the Electric Club, recently succeeded by David M. Roderick of the Hoover Company. Besides the cup, there were nine other fine prizes given by the leading jobbers and manufacturing firms.

COMING EVENTS

Public Relations Section, Northwest Electric Light and Power Association—

Meeting of Women's Committee at Salt Lake City, Utah, Oct. 23, 1925

Commercial Section, P.C.E.A.—

Meeting of Executive Committee with chairmen of Subcommittees

Pacific Gas and Electric Building, 245 Market Street, San Francisco
Oct. 23, 1925

National Association of Railroad and Utilities Commissioners—

Kansas City, Baltimore Hotel
Feb. 9-12, 1926

Lighting Bureau Plans Discussed by Illuminating Engineers.—The plans of the lighting bureau of the Pacific Coast Electrical Association for the coming year were discussed at a recent meeting of the Illuminating Engineering Society in San Francisco. Clark Baker of the National Lamp Works is chairman of this committee, and he presented a number of the suggestions which were discussed.

Electric Transportation Association Discusses Advertising.—Cooperative advertising was the main topic of discussion at the September meeting of the Electric Transportation Association of San Francisco. Those present expressed their ideas on the subject and offered various suggestions. A committee was appointed to investigate the problem more fully and to present a report with recommendations at the next meeting.

Book Reviews

A LABORATORY MANUAL OF ELECTRICAL SCIENCE

By R. O. BUCK and H. E. FROST, Instructors Electrical Department Lane Technical High School, Chicago, Ill.; paper binding; 136 pages; 68 illustrations; 8 tables; 12 sheets; 10-in. X-section paper; \$1.44. The Bruce Publishing Company, Milwaukee, Wis.

This work is an excellent collection of elementary experiments in electricity covering at least a full year of high school study. The experiments, fifty in number, range from extremely simple quantitative studies of magnetism to quantitative measurement of resistances, line losses and efficiencies. In general the experiments are more descriptive than quantitative in character. The apparatus called for in many of the experiments is simple and where more expensive equipment is used it is of standard commercial type. Several of the experiments presented for student use are on phases of the subject which usually are treated as demonstration experiments.

The book is of the loose-leaf type and contains an ample supply of co-ordinate paper as well as sheets of electrical tables and conversion tables. Its press work is excellent so that the sheets present a neat and attractive appearance. All directions to the student are printed in ordinary type while the questions to be answered, of which the book contains a large and well chosen assortment, stand out in bold-faced type. Spaces are left between paragraphs for written answers to the questions. The book is supplied richly with illustrations for every experiment. These include symbolic circuit diagrams, line and perspective drawings.

The chief criticism which occurs to one examining the manual is that perhaps the authors have done too much for the pupil for his own good. It may be questioned whether the pictures and diagrams of connections are not too explicit for the best development of initiative in the case of the better students. Many teachers do not approve of the rigid, "fill-in-the-blank" type of experimental write-up and to such this manual would not appeal particularly.

On the whole, this manual is a piece of work well worth while that should prove of considerable use in high-school classes in elementary electricity. It would seem to be adapted particularly to the need of the average and poorer students who have to lean rather heavily upon the manual for detailed guidance.

E.C.S.

Personals

A. H. Nicoll has been appointed sales manager of the Western Electric Company, San Francisco. His connection with the electrical industry dates back to 1908 when he began selling lamps for M. A. Bryte of San Francisco. In 1909 he entered the employ of the West-



A. H. NICOLL

ern Electric Company as sales record clerk. In 1912 he resigned to become appliance sales supervisor for the Utah Power & Light Company in Salt Lake City, Utah. In 1913 he again became associated with the Western Electric Company as city salesman in that city. Three years later he was appointed office specialist in charge of office sales. In 1920 Mr. Nicoll was transferred to San Francisco as a telephone specialist. After ten months in this work he was appointed specialty sales manager in charge of appliance sales. He occupied this position until Oct. 1 when he became sales manager. Mr. Nicoll has been very active in the affairs of the electrical industry, particularly the Pacific Coast Electrical Association. At present he is a member of the executive committee of the commercial section. He is also a director of the San Francisco Electrical Development League.

K. B. Ayres, W. H. Talbott and C. C. May represented the San Diego Consolidated Gas & Electric Company, San Diego, Calif., at the September meeting of the Technical Section, Pacific Coast Electrical Association in Los Angeles.

L. C. Ready, chief engineer for the California State Railroad Commission, and H. C. Butler, power supervisor for California during the war, have been employed by the Los Angeles Municipal Power Bureau to make a detailed survey of the power needs of southern California and particularly Los Angeles. They are to work in conjunction with the Chamber of Commerce committee of fifteen, which has been appointed by that body to make a power survey.

J. D. Ross, superintendent of lighting, Seattle, recently spoke on "How to Prepare for an Electrical Career" at the Y.M.C.A. in that city.

Arthur C. Noad, of B. W. Frank & Company, in charge of that company's San Francisco office at 306 Crocker Building, and B. W. Frank, of the same company, in charge of its office at 330 San Fernando Building, Los Angeles, have announced that the company has been appointed California representative for the Circle F Manufacturing Company, Trenton, N. J.

D. J. Young, formerly of the San Diego Consolidated Gas & Electric Company, San Diego, and now consulting gas engineer, Byllesby Engineering & Management Corporation, was a recent San Diego visitor.

K. L. Francis, general manager of the Albert Sechrist Manufacturing Company in Denver since its reorganization, has been elected president of the company following the recent death of Mrs. Hattie Sechrist. W. E. Sweet, former governor and prominent capitalist, was named vice-president; A. C. Foster, well known banker, treasurer; and A. J. Fowler, Denver attorney, secretary.

C. B. Merrick, formerly sales engineer, San Joaquin Light & Power Corporation, Fresno, Calif., will be district manager of the newly opened Los Angeles office of the Sandoval Sales Company, which has taken over the sale of Wesix electric heaters in southern California, Arizona and New Mexico.

H. W. Grant, since Jan. 1, 1924, superintendent of transportation of the southwestern district, Puget Sound Power & Light Company, Tacoma, Wash., has resigned to go into private business at Everett, Wash. Prior to coming to Tacoma, he had been associated with the Puget Sound Power & Light Company in many places and capacities, and is well known among electrical men in the Northwest. He is succeeded by T. F. Marsh, formerly superintendent of city lines.

W. L. Frost, Southern California Edison Company, H. H. Walker, of the H. H. Walker Company, and P. H. Booth, Edison Electric Appliance Company, all of Los Angeles, attended the meeting of the Advisory Committee of the California Electrical Bureau in San Francisco recently.

Robert Miller, Rocky Mountain district manager of the General Electric Company, Denver, has been elected to membership in the Denver Rotary Club.

L. M. Cargo, district manager of the Westinghouse Electric & Manufacturing Company, in Denver, has been re-elected a member of the board of directors of the Lakewood Country Club in that city.

H. P. Whitten, Western manager of the Apex Electrical Distributing Company, has been elected a member of the board of directors of the Commerce State Bank in Denver.

J. B. Witte, formerly equipment supervisor, protection engineering department, Southern California Edison Company, Los Angeles, is now division superintendent of substation operation for that company's northern division, which comprises the San Joaquin Valley properties.

J. W. Andree is the new chairman of the prime movers committee of the P.C.E.A. Technical Section. Mr. Andree has been associated with the power production department of the Southern California Edison Company, Los Angeles, for many years, in particularly close touch with all the mechanical features of the company's hydroelectric and steam stations.

J. Barclay Naugle, Western sales manager for Naugle Pole & Tie Company, Chicago, has opened Pacific Coast headquarters at 709 Call Building, San Francisco. The company maintains a branch office in the Peyton Building, Spokane, Wash.

W. E. Creed, president, Pacific Gas and Electric Company, San Francisco, returned Oct. 1 from a three months' tour in Europe.

W. R. Frampton, superintendent, meter and test department, Southern California Edison Company, Los Angeles, heads the safety rules committee of the Technical Section, P.C.E.A., for the ensuing year.

R. R. Cowles, 1925-26 chairman of the Technical Section of the Pacific Coast Electrical Association, needs little introduction to members of the electrical fraternity on the Pacific Coast. For several years he has been intensely active in both national and Pacific Coast Technical Section activities, serving as chairman of the Underground Committee for 1921-22; as chairman of the Safety Rules Committee for 1922-23; as chairman of the Overhead Systems Committee for 1923-24, and as vice-chairman of the Technical Section P.C.E.A. for 1924-25. Mr. Cowles has been a member of the National Overhead and National Underground Committee for some eight or nine years. At the present time he is vice-chairman of the National Overhead Systems Committee and as chairman of the Technical Section P.C.E.A. is a member of the National Executive Committee. He is particularly interested in association work and well qualified for his responsibilities. Although a native of the state of Michigan, Mr. Cowles is a graduate of the electrical engineering department of the University of California of the class of 1909. He entered the employ of the Pacific Gas and Electric Company in 1910 in the electric distribution department in



R. R. COWLES

Oakland. By 1921 he had become superintendent of underground distribution. At that time he was transferred to his present position in the central office in San Francisco as assistant engineer, department of electric distribution and steam engineering. In this connection his activities are devoted to overhead, underground, street lighting, line construction and metering problems on all lines of 25,000 volts and less. Mr. Cowles is a member of the American Institute of Electrical Engineers and of the Illuminating Engineering Society.

F. B. Schuyler, president Johnson Washer Company, Oakland, Calif., recently left on an extended Eastern trip. The company has been extending its trade territory actively during the past few months.

O. L. LeFevre, superintendent, Northwestern Electric Company, Portland, spent the latter part of September in the East attending meetings of committees of the Technical Section, N.E.L.A. at Detroit and New York.

R. L. Hearn, formerly assistant chief engineer, The Washington Water Power Company, Spokane, now in private engineering practice at Niagara Falls, N. Y., recently visited Spokane and Coast points.

F. H. Lane, manager engineering and construction, Byllesby Engineering & Management Corporation, and H. Boyd Brydon, mechanical engineer for the same company, visited the San Diego Consolidated Gas & Electric Company, San Diego, Calif., for several days recently.

H. H. Kerr, electrical superintendent of the Public Service Company of Colorado, Denver, is spending several weeks in New York City in connection with the placing of orders for a new generator and supplementary equipment to be installed in the new Valmont plant of the company.

P. E. Chapman, who has been named chairman of the underground systems committee, P.C.E.A. Technical Section, is superintendent of the underground system of the Pacific Gas and Electric Company, San Francisco. He has been connected with underground system work for twelve years or more.

E. B. Criddle, of the Southern Sierras Power Company, Riverside, was a recent visitor to San Francisco in the interests of his company.

D. M. Roderick, Seattle district manager of the Hoover Company, North Canton, Ohio, is the newly elected president of the Electric Club of Seattle. Mr. Roderick has been connected with the electrical industry for a number of years, having been closely associated with The Hoover Company since 1908. He has been an active member of the Seattle club, and the organization has been looking forward to an interesting and successful year under his administration. Mr. Roderick served during the World War as a captain of infantry in the capacity of minor tactics specialist. He is a graduate of the College of Wooster, Ohio.



D. M. RODERICK

K. E. Van Kuran, district manager, Westinghouse Electric & Manufacturing Company, Los Angeles, recently left on a six-weeks trip to the factory at East Pittsburgh and other eastern offices of the company. Mr. Van Kuran expects to return by way of Seattle.

L. L. Lamb, formerly assistant superintendent of equipment of the southwestern district of the Puget Sound Power & Light Company, Tacoma, Wash., has been promoted to be superintendent of equipment, taking the place of K. C. Schluss, who has been transferred to the Western United Gas & Electric Company, Aurora, Ill., a Stone & Webster property.

Edward Woodbury lately returned to the Los Angeles office of Stone & Webster, Inc., from the Baker River development in Washington, to resume his former duties as executive electrical engineer in connection with the addition to the Long Beach steam plant being constructed for the Southern California Edison Company.

Frank Von Ah has been placed in charge of the newly opened branch of Allied Industries, Inc., at 305 Ninth St., Oakland, Calif.

F. W. Paterson, assistant manager, switchboard sales department, General Electric Company, Schenectady, N. Y., recently visited San Francisco. Mr. Paterson formerly was for five years in the San Francisco office.

O. B. Stubbs, president Stubbs Electric Company of Portland, Ore., was a recent visitor in San Francisco.

F. N. Averill, with the Fobes Electric Supply Company, Portland, recently visited San Francisco in the interests of his firm.

W. W. Crocheron, formerly assistant manager of the service department of the Westinghouse Electric & Manufacturing Company in Denver, has been transferred to the Salt Lake City office of the company as a salesman in the central station division.

Thomas F. McDonough recently has arrived in Los Angeles to represent the Benjamin Electric Manufacturing Company. Mr. McDonough, who was formerly connected with the same company in Seattle, succeeds Herbert J. Mayo.

J. E. Macdonald, chairman of the Joint Pole Commission in Los Angeles, recently left on a business trip through the East. While there he will attend the conference of the Joint Pole chairmen in New York.

E. P. Kipp, representative of the Hazard Manufacturing Company, Denver, Colo., was a recent visitor in Salt Lake City, Utah.

H. R. Bygel, associated with the United Electric Supply Company, Salt Lake City, recently made an extended business trip through Idaho.

Lewis A. Lewis, sales manager, The Washington Water Power Company, and president, Northwest Electric Light and Power Association; W. H. Ude, director of public relations of the same company, and chairman of the association's Public Relations Section; and J. E. Royer, assistant general manager, were among the speakers at the first meeting of the organization of the women of that company. Miss Mary K. Walsh, chairman, also spoke.

H. N. Kalb, telephone engineer for the San Joaquin Light & Power Corporation, Fresno, Calif., is the new head of the inductive co-ordination committee of the Technical Section, P.C.E.A.

E. F. Stone, elected president of the Colorado Public Service Association at its recent convention at Glenwood Springs, Colo., is the assistant general manager of the Southern Colorado Power Company, a Byllesby property, with headquarters at Pueblo, Colo. He is a native of Virginia and received his earlier education in that state. His first engineering experience was gained with the Consolidated Gas & Electric Company of Baltimore. He later became associated with the Norfolk & Portsmouth Lighting & Traction Company of Norfolk, Va., and while with that company



E. F. STONE

designed and constructed all of the electric service requirements for the Jamestown Exposition. In his present position Mr. Stone is in charge of power transmission, city distribution, commercial sales and public relations. He is a charter member of the Pueblo Commerce Club, Pueblo Engineering Association and Lions Club. Mr. Stone served as first vice-president of the Colorado Public Service Association before his recent election to the presidency.

R. M. Alvord, of the General Electric Company, San Francisco, was in Los Angeles recently in the interests of his company.

George E. Lewis, head of the Rocky Mountain Utility Information Committee, with headquarters in Denver, attended the annual conventions of the American Electric Railway Association and American Gas Association in Atlantic City.

Obituary

Robert E. Davis, chief operating accountant, Pacific Power & Light Company, Portland, died Sept. 11, 1925, after a short illness. He was born in Portland in 1861 and spent the greater part of his life in that city. After the Spanish-American War, in which he served as a captain in the Second Oregon regiment, he took the position of secretary of the Willamette Iron & Steel Company, Portland, remaining until 1910, when he joined the accounting staff of the newly incorporated Pacific Power & Light Company.

TRADE NOTES

B. W. Frank & Company recently have been appointed the California representative for the Circle F. Manufacturing Company, Trenton, N. J. The latter company is an amalgamation of the E. H. Freeman Company and the Trenton Porcelain Company, both of Trenton. The Frank company maintains an office at 306 Crocker Building, San Francisco, in charge of Arthur C. Noad, and one at 330 San Fernando Building, Los Angeles, under the management of B. W. Frank. Through the addition of several new lines the company now has a complete line of wiring devices.

Gisholt Machine Company, Madison, Wis., has issued a small folder illustrative and descriptive of the cardinal points of superiority in the Precision balancing machine manufactured by the company.

The Erie Malleable Iron Company, Erie, Pa., has announced a new type of threadless conduit fitting, trade-named Kondu-Box, for which a great economy of installation is claimed. A complete line of these fittings, both round and oblong, is in production.

S. C. Johnson & Son, Racine, Wis., has issued a folder describing a new household electrical device to be known as Johnson's wax electric floor polisher. The company expects to place this on the market shortly.

A. Lietz Company, San Francisco, manufacturers of engineering, surveying, mining and nautical instruments, announces the publication of the fifteenth edition of its catalogue. While the major part of the book is taken up with illustrations and descriptions of instruments, a number of pages are devoted to drawing materials and field equipment.

Superior Refrigeration, Inc., Lima, Ohio, has announced the production of two types of electric refrigerating machines for household and commercial uses that are designed for use in meat markets, grocery stores, delicatessens, ice cream cabinets, as well as in residences and apartments.

Shere Metal Products Corporation, New York City, has a new device known as the Super-High Pressure Grease Gun which it claims fits on all the lubricating systems on cars and can be used to lubricate trucks, tractors, cranes, road-building machinery, building machinery, newspaper presses, printing and bindery machinery, mill machinery, steamship and railroad equipment, shops, locomotives and similar equipment.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has issued its new catalog No. 1737, which is illustrative and descriptive of its auto-valve lightning arrester.

Templeton, Kenly & Company, Ltd., Chicago, have available for distribution a report of the Underwriters' Laboratories covering tests and calibration data on their track jack. The calibration data are interesting and quite complete. There is a possible application of these jacks to pole-pulling.

The Estate Stove Company has announced a change in address from 366 Post Street to 180 Montgomery Street, San Francisco.

Electro-Kold Corporation, Spokane, Wash., has issued a folder which is descriptive of its new bungalow model Electro-Kold refrigerator. The folder is illustrated and describes the attractive features of this new model.

Cunningham Electric Company, Seattle, Wash., has filed recently an amendment with the secretary of state, increasing the capital stock of the company from \$10,000 to \$50,000.



Cookhouse help on the recent General Electric Company outing staged at the picturesque mountain home of J. O. Case, assistant manager of the Los Angeles branch, high up in the San Bernardino Mountains. Horseshoe-throwing, boxing, hiking and fishing furnished the principal outdoor features Saturday afternoon and Sunday. Various forms of indoor sports were enjoyed through the long night watches. Under the capable leadership of Joe Case, chef extraordinary, the culinary department provided food fit for the gods. Before breaking camp it was unanimously voted to make the outing an annual institution. Left to right are H. L. Schunk, J. S. Spureck, J. O. Case and H. C. Hill.

Allied Industries, Inc., with headquarters at San Francisco, and branches in Los Angeles, Calif., Portland, Ore., and Seattle, Wash., has opened a branch at 305 Ninth Street, Oakland, where a complete stock will be carried to serve the Oakland jobbing trade of the East Bay territory. Frank Von Ah will be in charge.

Allen Electric Manufacturing Company, Detroit, has issued catalog No. 26, which describes and illustrates its line of automotive electrical testing equipment and tools.

The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has issued a 16-page catalog describing the various features of its magnetic clutches. The book is well illustrated with photographs and diagrams.

General Electric Company, Schenectady, has added a new engine-driven welding set to its line of welding equipment. This outfit consists of a standard WD-12 welding generator driven by a 4-cylinder, 22½-hp. Buda engine, all mounted on wooden skids to facilitate moving from place to place.

Union Miniere du Haut Katanga is now producing and will offer its cobalt metal, salts and oxides to the market early in November. Inquiries may be addressed to the company's cobalt department, Room 609, 67 Wall Street, New York City.

The Four-Wheel Drive Auto Company, Clintonville, Wis., has issued a new catalog, illustrative and descriptive of its earth-boring and pole-setting equipment, which digs the holes and sets the poles. This equipment is distributed by the Western Electric Company.

The Electric Controller & Manufacturing Company, Cleveland, Ohio, has announced the appointment of Eicher & Bratt, Seattle, as representatives for the sale of E C & M control equipment in the states of Oregon and Washington, Alaska and the "Panhandle" district of Idaho.

Electrical Repair & Equipment Company is the name of a new organization that has opened a well equipped shop at 1160 Bryant Street, San Francisco, for the repair, rewinding, etc., of motors, generators and transformers. Harry Farquhar, formerly with the Oakland works of the General Electric Company, and John W. Massie, formerly with the switchboard department of the General Electric Company, are partners in the company.

Wagner Electric Corporation, St. Louis, Mo., has announced that it will handle the servicing and distribution of replacement parts of the Hydraulic Brake Company, which owns and controls the patents of Lockheed four-wheel hydraulic brakes.

The Mutual Electric & Machine Company, Detroit, recently has developed a new device called Bull Dog Safety Fusenter, which it is claimed is an ornamental, luminized case designed to be installed, flush with the wall surface in any room, hall or stairway wherever most accessible for the replacement of a fuse.

Charles Cory & Sons, Inc., New York, has issued a new bulletin describing the Cory audible and visible signals featuring turbine order systems.

The Hurley Vacuum Cleaner Company, Chicago, Ill., has announced the manufacture of a new vacuum cleaner. It is a double-duty machine as it may be used as a straight suction type.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has developed a new high-intensity spotlight designed for the purpose of illuminating traffic officers stationed at street intersections.

Brown Instrument Company, Philadelphia, Pa., has issued a new catalog, No. 87, containing illustrations and descriptions of its automatic temperature control instruments.

Valley Manufacturing Company, Des Moines, Iowa, has placed on the market what is claimed to be an innovation in corn-popping machinery, an electrical corn popper. A peanut roaster is also part of the device.

The Swartzbaugh Manufacturing Company, Toledo, Ohio, formerly the Toledo Cooker Company, has issued recently a new illustrated booklet describing its extensive line of Everhot products.

Premier Electric Company, Chicago, has issued bulletin No. 95, which fully describes its entire line of radio parts, including the Premier "Ensemble."

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES



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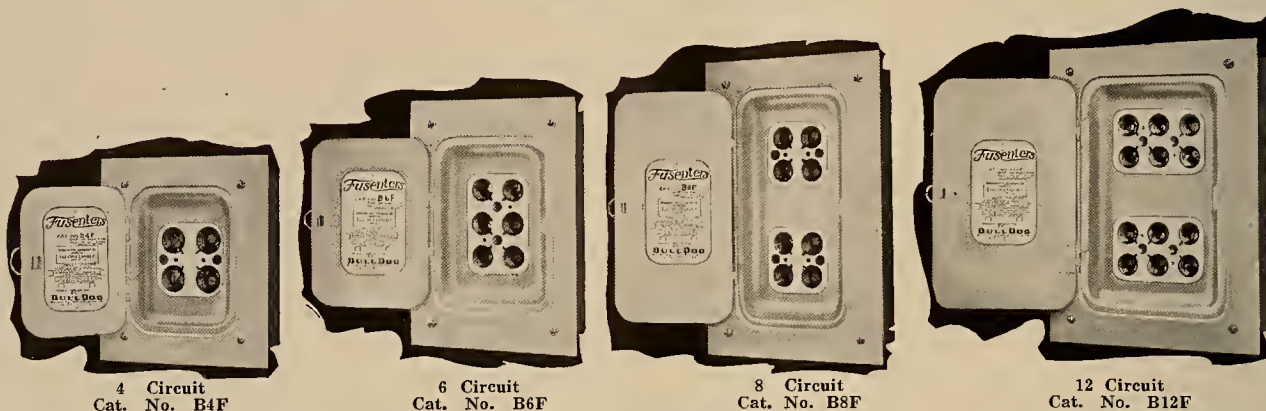
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IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication
Published Semi-Monthly
Established 1887

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R. N. PHELAN, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

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VOLUME 55

SAN FRANCISCO, NOVEMBER 1, 1925

NUMBER 9

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McGraw-Hill Company of California — 883 Mission St. — SAN FRANCISCO
Northwest Office: 1206 Spalding Building, Portland, Ore.
Publishers of JOURNAL OF ELECTRICITY

JAMES H. MCGRAW C. T. HUTCHINSON J. W. OTTERSON
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WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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By McGraw-Hill Company of California

Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation
Printed in U. S. A.

Here Is a Record

A sales record which demonstrates the net results of directly applying the McGraw-Hill "Four Principles of Industrial Marketing" is the subject of the sixth of a series of full-page advertisements which are being run in the principal newspapers of the country by the McGraw-Hill Company. The attention of our readers is called to the reproduction of this advertisement which appears on pages 44 and 45 of this issue.

The story of the remarkable success of the producer of an important raw material whose experience is cited proves the need for a higher industrial sales efficiency. Better industrial selling was accomplished by this manufacturer through the application of the following four principles in which the McGraw-Hill Company is trying to arouse a keener appreciation on the part of industry:

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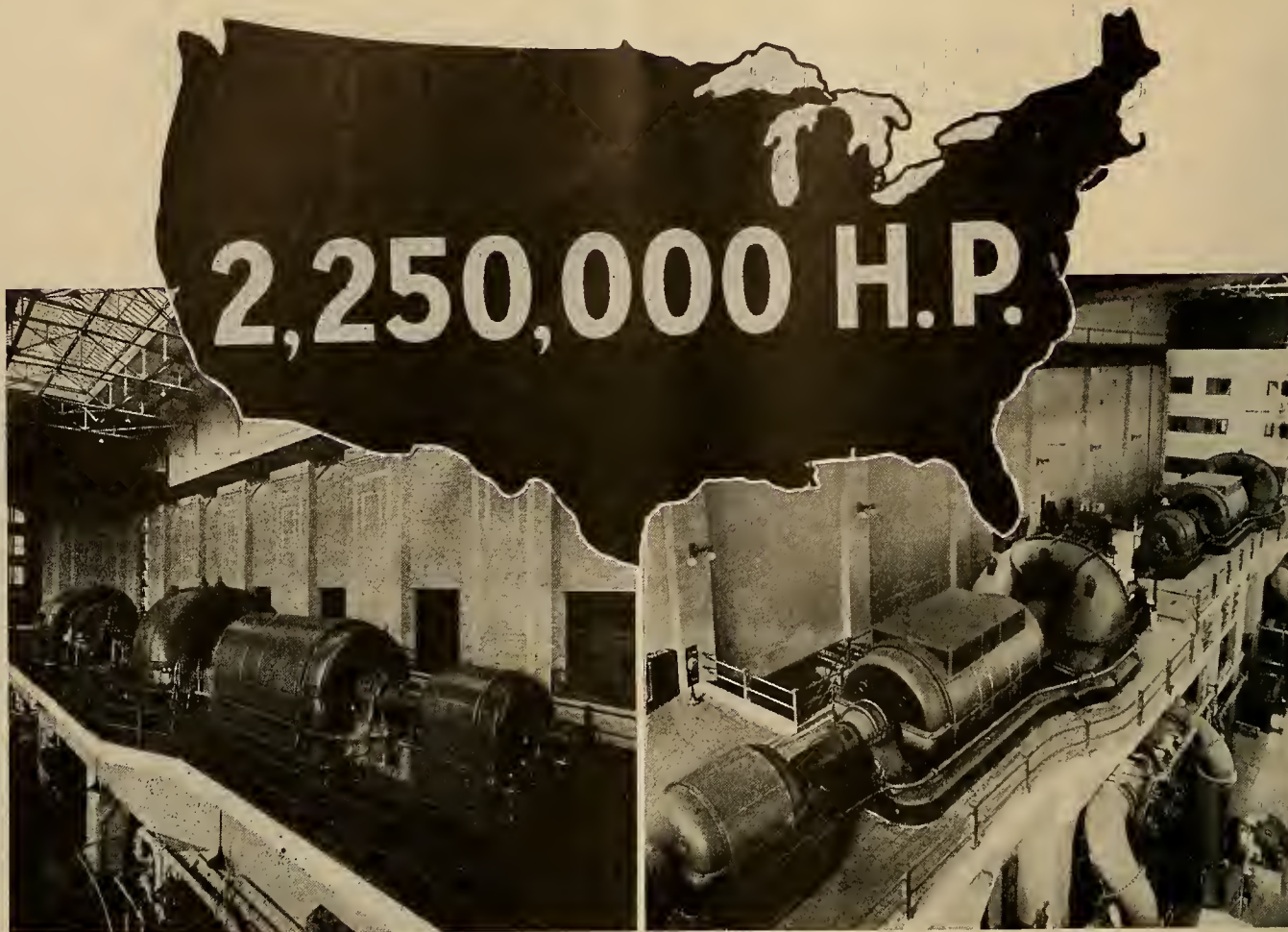
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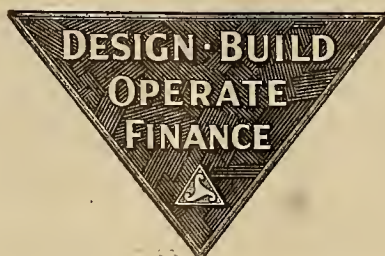


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EDITORIAL

Half-Truths Are Often Deceptive

TRUTH half-told is a dangerous and subtle weapon. It is a favorite tool of the professional politician. Witness the two innocent paragraphs appearing recently in the Hearst press under the signature of Arthur Brisbane:

"Ponca City, in Oklahoma, with 15,000 population is free from taxes. Buy your house and that is the end of it. No tax-gatherer comes around. And it's simple, as O. P. Callahan, Ponca's mayor, will tell you. The people of Ponca City own their light and power departments, managed with the municipal water works. Profit on the city's light, water and power plant is sufficient to pay all taxes.

"How does that impress you? And please note that rates charged for water, light, and power in tax-free Ponca City are lower than in other places where citizens pay taxes and also enrich public service corporations, privately owned."

A pretty picture for the unsuspecting reader Mr. Brisbane paints. But he uses only half the facts. An investigation of the situation in Ponca City casts a shadow here and there on Mr. Brisbane's picture. Ponca City citizens are not tax-free; they pay state and county taxes as in any other town, so the tax-gatherer does function. While many of the city expenditures are met with earnings from the municipal light and water department, some are paid from tax levies. Rates are not lower than in cities served by private companies; they are well constructed and approximately the same as in other cities in that section of Oklahoma.

But there is an unusual situation that makes all this possible. Ponca City is the headquarters for one of the largest oil-refining corporations in the Southwest. The present mayor is a former vice-president of this company. The present executive vice-president of the company was formerly mayor of the city and takes an active part in municipal affairs. The city is being operated on a business basis and business men are running it.

Recently one of the large private utilities in the state was asked to examine and appraise the municipal electric system with the option of purchasing it. The present city officials realize that while the system may be making money now, there is a possibility that political management at some future date may dissipate all earnings.

Thus the case of Ponca City, Oklahoma, is not all that Mr. Brisbane would have his readers believe. Had he revealed all of the facts his picture would not have been so rosy. Our only regret is that all of the millions of readers of Mr. Brisbane's column will not know the facts as they are published here.

One Genuine Method of Solving the Automobile Headlight Problem

POSSESSION of a little card, signifying that the bearer thereof has expended seventy-five cents to have his automobile headlights tested and adjusted, has not solved the problem of automobile headlight glare. On paper the theory sounds very well, but in practice there are a number of conditions which shake its security. Every road bump, every car track, every vibration constitutes one of these mitigating conditions.

It is not enough to conform to the letter of the law once or twice a month by visiting headlight-testing stations. It helps the motorist who has to look into glaring headlights not one whit, if after leaving the testing stand, a jar or twist will leave the lights of any given car in position to blind everyone into whose range they come. No amount of legislation nor even of testing and adjusting can prevent glare from strong headlights along rolling roadbeds.

Like many another panacea, the remedy has been applied to the effect rather than the cause. Even if enforcement of the law were 100 per cent, which it can hardly ever be—it would keep too many police officers up too many nights—the fact remains that roads are not ideal in contour, and lamps do get out of adjustment from any or many of a variety of causes. Even perfect adjustment does not prevent a car coming up over a rise in the road from sending its perfectly focused rays full into the eyes of drivers approaching on the other side.

Yet there is a way to remedy the condition that is not dependent on law enforcement. It is much more simple and a thousandfold more effective. It consists of illuminating the highways scientifically.

Regardless of road conditions, regardless of the condition of the apparatus of the individual cars that traverse them, scientific highway lighting will be uniform, will be good, and will shed its rays alike upon the just and the unjust, a no mean factor in itself.

The idea carries with it commercial possibilities to the electrical industry, naturally, but more than that it will bring satisfaction that the problem is being solved in the best and most sensible way. The success of street lighting, where illumination has been the chief object sought rather than mere ornament, has brought forth as a by-product this vision of highway illumination potentialities. That the headlights of an automobile are practically unnecessary on well lighted streets has suggested that highways might be made safe in the same manner.

The electrical industry is not the only one which

will profit from highway illumination. Tests made recently on a stretch of highway in the East have demonstrated actually by count that without altering the highway traffic could be increased 100 per cent by having them well lighted. Practically all the trucking load upon highways is carried at night. With well lighted highways the amount of trucking over highways can be increased 100 per cent, the experiment proved, and the highways still remain safe for traveling motorists.

Compared to the investments being made in safety devices, road-widening, and parallel road-building, the investment required to light adequately the main trunk highways of the state would be very small. On such highways, driving with full-intensity headlights would not only constitute a misdemeanor—it would be absolutely uncalled for.

Speed the day when the West's highways will be lighted safely at night, that day in which traffic will demand so much more of them.

Importance of Public Relations and Sales Departments

THOSE who enjoy a background of twenty years experience or more in the electrical industry have noted with increasing interest the growing importance of the sales and public relations departments of the central stations. About the beginning of the twentieth century when the central station idea seized upon the imagination of Western men, the only problems were finance, engineering, construction, operation and maintenance. The sales effort, so far as the disposal of the output of the plants was concerned, consisted chiefly in waging a vigorous campaign to close all of the isolated plants within the sphere of operations of the central station. This was before the state regulation of utilities began, so prices were controlled largely by the competitive conditions in each district.

As for public relations—that term had not even been invented. “The stockholders be pleased” was the motto—the public could take a chance on what was left, if anything.

Now the central stations have a real selling problem. They are engaged in selling the electric servant, in expounding its utility and many advantages, and in a most constructive way, too. Production has caught up with consumption, and beyond, so enlarged markets must be created. Then, with state regulation, the threat of industrial socialization and other symptoms of political unrest, comes the vital necessity for informing the public as to the whole story of the central station, its functions and its responsibilities to its stockholders and to those whom it serves. Enter, therefore, the salesman and the public relations expert.

Not so very long ago the central stations had a dignitary generally called the manager of the commercial department. His job was to do whatever he could and at the same time keep out of the way of general managers, chief engineers and others of real importance, and if he succeeded in shutting down an occasional gas engine, he had done his job. Now we have vice-presidents in charge of sales and public relations with highly skilled staffs under

them. They are becoming more and more important every day. Truly, these two departments are the fastest growing divisions in the central station industry, and would appear to offer the best possibilities for the young man who desires to make this his life work.

“What Is Success?”

TO succeed is an ambition harbored by almost every man, but few will offer the same definition of success. In a recent national contest conducted by the Western Electric Company through the columns of its house organ, “Western Electric News,” C. L. Huyck, of the San Francisco office of the company, was awarded first prize for his answer to the question, “What is Success?” Mr. Huyck's answer is printed here, first because it merits careful reading by our subscribers, and second, because the honor he has won deserves recognition. His definition of success follows:

“Ten square miles of shell craters and 10,000 men wound like red yarn upon the barbed wire—that's Success for the General.

“A dinosaur's egg in the wind-blown Mongolian desert; a new census for each millionth of an inch—that's Success for the Scientist.

“A whole countryside on a printed page; a rainbow of romance that arches across the centuries; thoughts or characters that inspire, assuage or profoundly move—that's Success for the Writer.

“For Success lies not only in Achievement but also in Service, and Service means Helpfulness and therefore Unselfishness. The highest Success, theoretically, would be that which carries the greatest good to the greatest number of people.

“But the lives of most of us are spent, not in the Himalayas of our dreams but in the market place.

“Therefore:

“A day's work well done; some official or personal recognition of it; health; a sense of humor; a hobby; spiritual and mental growth; a Little Gray Home in the West and a dear girl who believes in us; anchors to windward for rainy weather and a course that will land us within the harbor before sunset—that's Success, for Most of Us.”

Can any more be added to this definition? We think not.

Be It Fish or Kilowatts, Politics Has the Same Effect

IT'S a far cry from fish to kilowatts but in this particular writing there is a common link—politics. Denver, the Mile-High City, has made an epicurean treat of trout; its restaurants, hotels and summer resorts feature this fish to the delight of visitors. Hence fish farming in the vicinity of that city is a profitable business.

The state also is in the fish-farming business. Since Colorado is advertised as the sportsman's paradise, steps must be taken to keep the streams replenished with game fish. The job falls to the state fish hatchery, which is adjacent to the private trout farms in the vicinity of Denver. With this introduction the remainder of the story can best be

told in the words of one of the most successful fish "farmers."

"Mine is a profitable business; this year it will net about \$15,000. I will, by the end of the season, have sold more trout than all of the fishermen in the state have taken from the streams. In addition I'll supply the state hatchery with the majority of the eggs it uses for hatching fry for restocking. Maybe I'll also sell them some of my 'spawners.'

"Down the road at the state hatchery they will spend \$250,000 of the state's money this year for restocking and they will do a poor job. Why? Because they don't understand the business. Trout farming is a specialized business, with difficulties that can only be overcome after years of careful study and experience. Add to that the hazards incident to transporting trout fry from the hatcheries to the streams where they are to be planted and the problem is doubly difficult.

"Then there is the question of politics. A short time ago the commission fired the superintendent of the hatchery because he was not 'politically minded.' In the place of the man who had been in charge of the hatchery for fifteen years they appointed a successor who had never seen the inside of a fish hatchery until two weeks before he took the job. Heaven help the sportsmen and the taxpayers' \$250,000."

The moral is almost too obvious, even to the layman who has never felt the tug of a half-pound rainbow on the end of an eight-ounce rod. Politics and business will not mix, be it in the raising of trout or the generation of kilowatts.

Somebody Must Sell

Electrical Appliances

AS a rule when the subject of central-station merchandising comes up for discussion in the Western states other members of the industry are apt to regard it as a competitive movement jeopardizing their own interests. We are inclined to doubt very much whether central-station merchandising, wherever it is conducted, is actuated by any motive other than a necessity for load-building. Assuming this to be true, and assuming also that central-station merchandising efforts are not accompanied by destructive competition, they cannot help but prove to be a benefit to established members of the industry rather than a detriment. Any movement or campaign that attracts the attention of the consumer to the value of electrical service of necessity must be reflected in better business conditions for everybody. The central stations, however powerful they may be or however actively they may solicit, cannot obtain all the business or even a very large part of it. That central-station sales executives recognize this fact is shown clearly in recently announced campaigns in which careful attention is paid to ways and means of extending the utmost co-operation to dealers in each community where the campaign is under way.

As a further extension of this thought, a most interesting meeting was conducted in San Francisco recently under the auspices of the Great Western Power Company and the Pacific Gas and Electric

Company. The attendance at the meeting was nearly 300, and a quite considerable number of these consisted of executives and salespeople from the so-called non-electrical outlets—merchandising establishments, department stores and similar institutions. Three expert salesmen, well grounded technically in their subjects, delivered lectures on the sale of electric domestic refrigerating apparatus, air and water heaters and electric ranges. The interest that was evinced by the audience is a healthy sign of the awakening on the part of department stores and the recognition of the fact that such items soon will become commodity merchandise rather than specialties.

In general, we believe it may be stated truly that the central station does not care who sells electrical appliances so long as somebody does, but that somebody must sell them.

The Little Things That Count

IF the replacement of 50-watt lamps by 100-watt lamps seems a slight matter, consider the difference in yearly revenue from the viewpoint of increased watt-hour consumption and it becomes a matter hardly so trivial. Consider, too, that the additional revenue is gained without outlay in extension equipment, and this question of lamp replacement comes to have a real meaning.

As the result of a recent lamp sales campaign, reported in this issue elsewhere, one central-station company figured that for every 100-watt lamp which took the place of a 50-watt lamp, it could count on an increase in revenue of \$3.75 a year. And since in most cases the 50-watt lamp thus replaced went into another socket somewhere in the house, filling a vacancy which had existed some weeks, the matter resolved itself into one of real importance.

In the three months of its sales campaign this company's agents replaced several thousand 50-watt lamps with some of higher wattage. Added to the year's revenue, although a small item, the campaign brought a welcome addition to the load.

Safety Rules Committee to Continue its Work

COMPLETION of the Electrical Safety Orders of the California Industrial Accident Commission brought to a close the work for which the safety rules committee of the Pacific Coast Electrical Association was organized. On the eve of the dissolution of this committee it was realized that the work completed represented only the initial effort of the group. In fact these orders represent the beginning of some real work. The committee will be continued indefinitely.

Full and satisfactory application of the Safety Orders best can be accomplished through the activity of this body in assisting a common interpretation. Co-operation with the Association of Electrical Inspectors is to be an important part of the program for the coming year, and the results should be highly satisfactory.

Better Kitchen and House Lighting Literally "Brought Home" in Fresno

THAT well known metaphor, "moving the mountain to Mahomet," to use modern parlance, is "old stuff." There has been so much mountain moving, and "Mahomet" or his brethren have made so many pilgrimages to the various modern mountains that to use the expression now is to be trite. But trite or not, the recent lamp sale conducted by the Valley Electrical Supply Company, of Fresno, Calif., was just such a pilgrimage.

To carry the metaphor further, to the "mountains" of indifference and domestic unconcern went the "Mahomets" of the Valley Electrical Supply Company, carrying with them in their little fibre suitcases the means to conquer these mountains. That they did conquer, and in so facile a way, meant too that they carried the mountains back with them, mountains this time of increased good will and revenue.

H. H. Courtright, manager of the Valley Electrical Supply Company, the merchandising department of the San Joaquin Light & Power Corporation, conceived the idea that if housewives did not come to the company for better lighting the company must go to the housewives with the lighting. The idea, simple enough of itself, was not quite so simple to execute. There are a good many housewives in Fresno. To go to each one, demonstrate better lighting facilities, convince each one of its necessity, and bring back cash instead of lamps, presented a problem requiring organization and study.

When the details had been thrashed over thoroughly, the lamp sales campaign contemplated by Mr. Courtright resolved itself into a few important elements. Two salesmen were selected to be the "Mahomets," if you will. A light delivery truck on which was painted an attractive poster of "the new kitchen lamp" was placed at their service, and these two salesmen were sent forth to make house-to-house calls.

The new 100-watt white Mazda lamp was selected as the entering wedge to get the housewife's attention. It is a lamp which gives an abundance of light without glare and was found to be very effective in converting the usual poorly lighted kitchen into a bright, attractive room. It was selected also because it had been found in a pre-

WITH a special kitchen lamp in one hand and a suitcase in the other, salesmen brought better lighting to the homes of Fresno, Calif., instead of waiting for the homes to come to them for better lighting. This is a story of a campaign which yielded better lamp sales, more revenue to the central station, and best of all, increased good will and recognition from the home-owners of the community.

vious survey that 87 per cent of the kitchens of Fresno were equipped with a ceiling flange and flat or cone reflector, wall switch, and one or more convenience outlets. Simply placing one of the new white 100-watt lamps in existing reflectors gave a kitchen the brightness of day, yet the light was free from the glare which results from the use of clear lamps. Moreover, this installation paved the way for a more adequate lighting unit later.

With the information obtained in the survey to work upon, the two salesmen and their light delivery truck went into the field to make their house-to-house calls. In making a call, each salesman carried in one hand the new kitchen lamp. In the other he carried a kit in which were shown sixteen types and sizes of lamps, including colored lamps. A stock of each of these lamps was carried in the truck. The kit resembled a fibre suitcase in appearance, but was wired with sockets and a lamp cord that could be attached to any outlet. Each lamp in the display could be lighted at will to show contrasts or effects. If a housewife selected a lamp from the kit it was taken out and delivered at once. Then the lamp was replaced in the suitcase from the stock on the truck before the next call was made.

The basis of the salesmen's approach was the introduction of a new lamp designed to meet the needs of the kitchen. This approach, coupled with the information that the lamp was being introduced by the retail sales department of the power company, opened the doors of 50 per cent of the homes called upon.

A demonstration was made quickly and the price of the lamp quoted. When mentioning the price the salesman called attention to the fact that the cost of the old lamp should be deducted, since the old lamp, usually one of 50 watts, might be placed in some empty socket and still remain in use. As a result sales were made to 50 per cent of those permitting demonstrations. As each call was made, the salesman filled out a tag giving all data necessary for future reference.

During February, March and April, calls were made on 7,705 houses. Entrance was had into 3,143 homes and sales were made in 1,987 homes. But the net results in lamp sales were not limited to

the salesmen's operations. Counter sales of 100-watt white lamps at the store jumped to 20 per cent of the number disposed of by the salesmen on their calls. Dealers throughout the city also reported an unusual demand. It may be assumed that the increased demand for the lamps came from those who had been solicited but who did not buy and from housewives in homes where entrance was not gained but who were sold over the back fence by their next-door neighbors.

The results of the campaign extended beyond the mere sale of lamps. Numerous appliances and lighting fixtures were sold, either by a salesman or as a result of his sales talk. As representatives of the power company the salesmen gave courteous consideration to complaints, reporting at once the troubles of the consumer, fancied or real, thereby promoting good will. Although intangible, the advertising value of the personal contact was felt to be considerable. Each salesman extended to every customer a special invitation to call at the attractive new store of the company.

Many sales of appliances and fixtures were made by the salesmen simply by mentioning the conveniences offered by electric irons, toasters, grills, fireless cookers, percolators, and other appliances. The suggestion that a new shade and a colored lamp would lend interest to a room frequently brought results. New fixtures were discussed. This naturally led to a description of the complete fixture display rooms of the Valley Electrical Supply Company and the service department.

Furthermore the customer's opinion of the power company service was asked for and notes were made on even the most trivial complaints. Frequently a short explanation was all that was necessary to satisfy the complainant. But the most gratifying results obtained were that the public became educated into thinking of better lighting, of the Valley Electrical Supply Company, and of the San Joaquin Light & Power Corporation whenever anything electrical was contemplated.

While the actual expense of the campaign was \$200 greater than the profit derived from the lamps sold by salesmen on the streets, this deficit was more than offset by business traceable directly to the sales campaign. The profit on additional white lamps alone, sold over the counter, amounted to \$105, one-half the deficit on the campaign, while sales of fixtures, appliances, convenience outlets and wiring jobs showed a satisfactory dealer's profit for the campaign. The additional revenue to be derived by the power company, on the other hand, may be seen from the following analysis:

Assuming that the average lamp replaced by the new 100-watt lamp was one of 50 watts, the gain in load to the power company was 50 watts for each new lamp installed.

Estimated Annual Revenue for Each 100-watt White Lamp Installed

Average hours of use per year	1,000
New lamp watts	100
Kw-hr. consumption per lamp per year	
(1,000 x 100)	100

Kw-hr. consumption per lamp per year	100
Average consumer's rate per kw-hr.	\$.075
Revenue per year per 100-watt lamp	\$7.50
Minus 50-watt lamp replaced	\$3.75
Additional revenue per 100-watt lamp sold ..	\$3.75

During the month of March 1,461 lamps were sold, 1,168 of which were 100-watt white kitchen lamps.

Estimated Revenue Per Year for March Sales

Total kitchen lamps sold	1,168
Additional revenue per lamp	\$3.75
Total increased revenue per year	\$4,380.00

This does not include probable increase from other lamps sold.

The 100-watt white lamp was sold at 55 cents, an amount which was paid in cash by 83 per cent of the purchasers. Only 17 per cent asked to have the bill charged.

The campaign is to be resumed this fall and winter, when it is expected that the success of the spring campaign will be repeated.

Using the three months of the spring campaign as a basis, it is estimated that 7,500—or 40 per cent of the homes in Fresno—will be equipped with 100-watt white lamps during the year, which should bring an increased revenue of \$22,500 to the power company, in addition to stimulating interest in better lighting and building up company good will.

Open-Pit Coal Mining in Montana

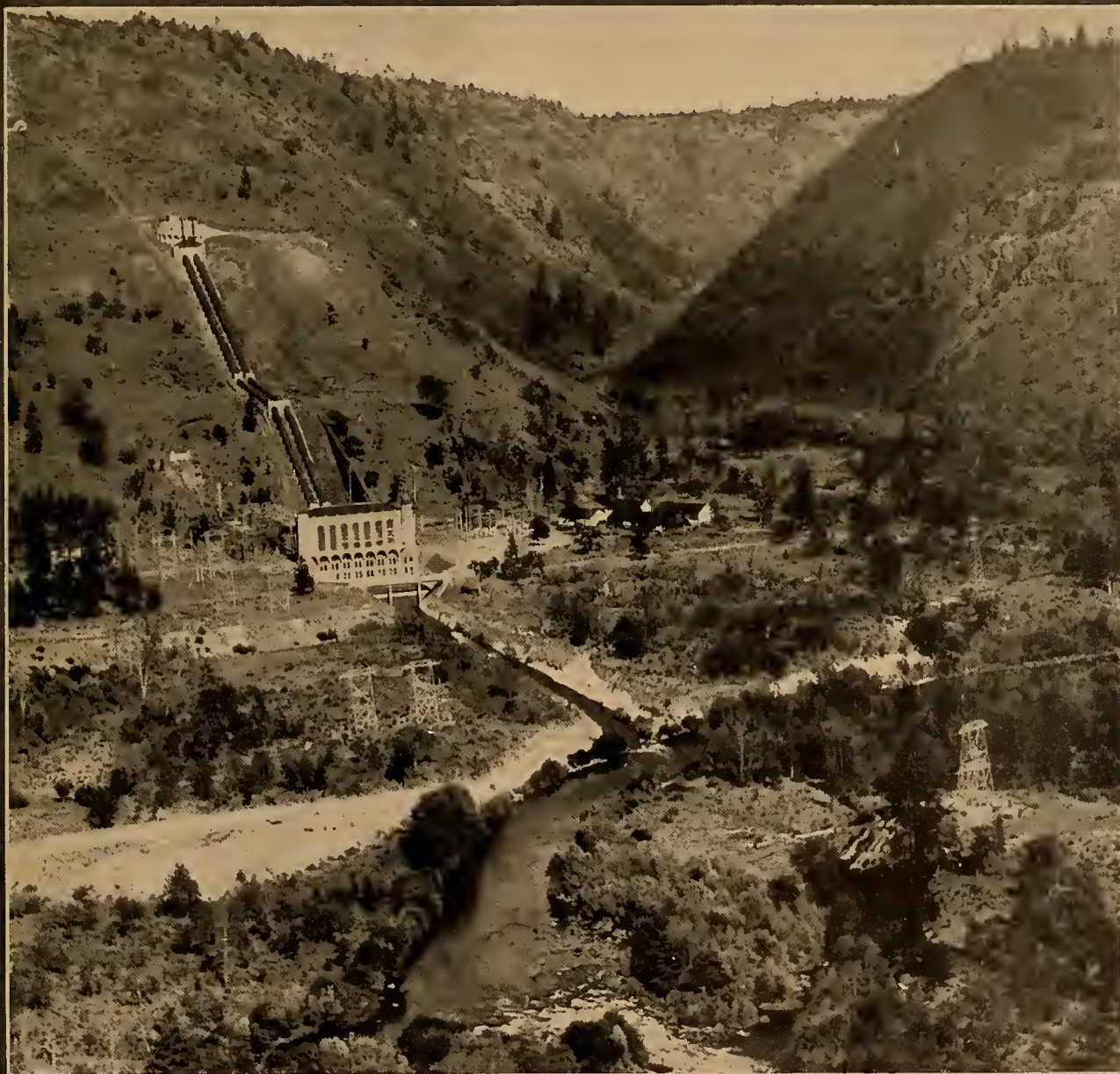
THE first completely electrified open-pit coal mine in the United States was that started recently at the newly made town of Colstrip, approximately 35 miles south of Forsyth, Mont. The coal bed, about 180 acres in extent and 25 ft. deep, contains sub-bituminous coal with a heat content of 11,000 B.t.u. The output of the mine is to be used for the locomotives of the Northern Pacific railroad in Montana.

As a result of a thorough study of the circumstances it was decided to utilize electricity in mining the coal of this bed. An extension was run by the Montana Power Company from its 35,000-volt line to the vicinity of the strip mine. Electric equipment next was procured to strip off the overburden from the coal, to mine the coal itself, and for hauling. An electric shovel for stripping, using a drag-line excavator; a coal loading shovel, and two 60-ton electric storage battery locomotives make up the equipment.

Operation of the mine is interesting. While near the shovel, with its cars ready for loading, the electric storage battery locomotives are charged from a flexible cable, running from a bank of transformers on the shovel and plugged into the locomotive. A motor generator in the cab of the locomotive thus is set in motion to recharge the storage batteries while the locomotive is idle. While coal is being mined from one strip, the overburden is being removed from the next and is cast into the excavation resulting from the removal of the coal.

Power Projects Are Spectacular from Aeroplane

KNOWLEDGE of aerial photography derived during the war rapidly is being applied in commercial channels. Chief among these applications is aeroplane surveying, a development which is readily finding a place in the study of power projects. Aerial maps have been applied widely in laying out high tension transmission lines because they afford a ready means of studying available routes and choosing a right-of-way which does not interfere with buildings, etc., and which avoids serious obstacles in the physical terrain. Aeroplane maps were used in the laying out of both the Laguna Bell line of the Southern California Edison Company and the tie-line now under construction between the systems of the Great Western Power Company and the San Joaquin Light & Power Corporation. The application of aeroplane maps to hydroelectric power projects is comparatively new. The three accompanying pictures give some idea of the spectacular conception of some of the major power developments from the air. The first shows Pit No. 1 power house, with the incoming 60-kv. line from the Hat Creek plants on the right, and the outgoing 220-kv. double circuit line in the foreground.





HOW the Pit 3 diversion dam and Lake Britton look to a bird is shown above. Below is a unique view of Pit 3 power house which gives a clear conception of the layout of this plant. The pictures were taken on the Pit River project of the Pacific Gas and Electric Company by a pilot and photographer of Aerial Surveys of California, San Francisco.

Photos copyright Aerial Surveys of California, S. F.



Methods of Preserving Poles and Economies of Pole Treatment*

By L. R. Gamble

Assistant Engineer, The Washington Water Power Company, Spokane

THE steadily increasing demand by the various utilities for poles to be used for construction and replacement purposes very rapidly is depleting the timber resources of this country. This enormous demand naturally has produced a constantly decreasing supply and a constantly increasing cost of production, since the logging operations must be carried on necessarily in the more inaccessible districts. These conditions have been particularly apparent in the cedar-pole industry of the Northwest. For the past few years the Western red cedar pole has been in demand in almost every state of the Union.

This increase in the cost of poles in general has been more or less responsible in turning the pole-users to the use of pole timber which was formerly considered as less desirable, and to the use of preservatives to increase the life of poles. It is probably not fair to say that price alone has brought about this change but that along with it has been the realization of the necessity of conserving our timber resources. At any rate the result has been that many utilities are using fire-killed cedar, fir, and yellow pine poles. Also that due to the increasing demand for treated poles rapid strides are being made in developing efficient processes of preserving poles.

To show the annual increase in the demand for butt treatment of the cedar pole alone, the following statistics will be of interest. In the year 1920, 43 per cent of the Western red cedar poles sold were butt-treated by some one of the processes. In 1921 this percentage increased to 64 per cent, in 1922 to 74 per cent, and in 1924 to 90 per cent. With this increase in the number of poles treated the natural tendency has been for the pole-producer to provide as a part of his service the business of preserving poles. In the past it has been customary for the larger utilities to treat their own poles, but with the increasing demand and with the smaller companies going to the use of treated poles this

MR. GAMBLE'S paper, prepared as part of the report of the overhead systems committee of the Technical Section of the Northwest Electric Light and Power Association, being most complete in its treatment of a large subject, is too long to be presented here in its entirety. The extracts published are chosen with the view of presenting those parts of the paper that are apt to interest most a large number of readers.

business has fallen on the producer, and from the economic viewpoint the job no doubt belongs to him.

In the superficial treatments the preservative is applied to the surface of the pole, and the only penetration secured is that which occurs naturally. Among these treatments are the dipping, pouring, spraying and brush treatments. These treatments may be given on the job or at the pole yards. A detailed description of the above treatments is covered in pre-

vious reports to the association and will not be elaborated upon here. The dipping treatment is, however, one of the open-tank methods and consists in erecting the poles with their butts in a tank of hot preservative. The poles are allowed to remain in this bath 15 minutes or longer, if necessary. This treatment gives a more uniform penetration than the brush treatment. It is somewhat more expensive, however, and thus has caused some pole-users to prefer the brush treatment. Under the dipping treatment are two specifications, one known as "Specification A" and the other as "Specification AA", the only difference being that the preservative used in the former is carbolineum and in the latter, creosote.

In the impregnation treatment the commonest methods employed are the pressure method and the open-tank method. Poles treated by the pressure method have only a limited field because it must be confined to such wood as southern yellow pine, which is sufficiently permeable to afford thorough penetration. It is found that the pressure method when applied to cedar or chestnut will give very little added penetration over the open-tank method and that in the case of cedar poles they will split very badly. Another reason for the limited field is that it is very costly.

There has been developed recently the pressure method for treating the butts of poles called the localized pressure method. This method consists of placing a number of poles in a vertical tank long enough to take the entire pole and then admitting oil to the required level and carrying out the regular treatment. There is still another method being developed that uses a horizontal cylinder instead of

*Extracts from a paper read before the second annual general meeting of the Technical Section of the Northwest Electric Light and Power Association, Spokane.

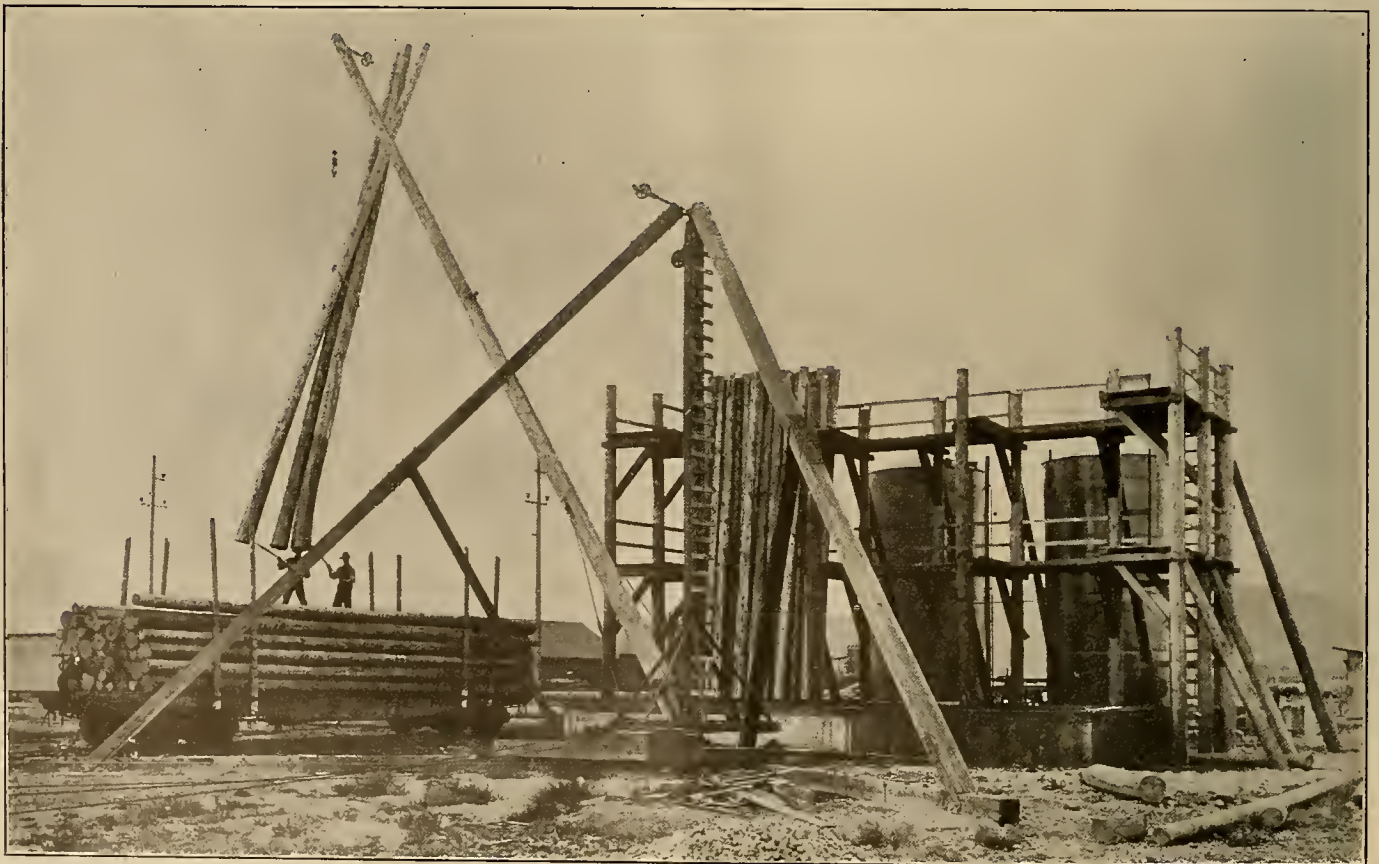
a vertical cylinder. In this process the poles are placed in the tank and in some cases are steamed in order to drive off excess moisture. After this, hot creosote is supplied at high pressure varying from 40 to 80 lb. per sq. in. on the portion of the poles to be treated. The excess creosote is drawn off from the bottom of the tank and is re-used in the spraying-process. This treatment is continued over a period of from four to eight hours, depending upon the timber and the amount of impregnation desired.

A common treatment among the open-tank methods is the specification "B" treatment in which the poles are placed in upright tanks with the butts fully and continuously submerged in a preservative. The duration of treatment is divided between the hot bath and a cold bath. The poles are left in the hot bath for a minimum of four continuous hours, after which they are subjected to a cold bath in which they remain for a minimum of two hours. Poles that are given this treatment are tested for penetration by the use of the increment borer and when, due to variation in the density of the sapwood, it is found that the penetration is not sufficient the duration of the treatment is extended. The preservative used is creosote conforming to a standard specification. The temperature of the preservative for the hot bath should be about 212 deg. F., and may vary between 180 deg. to 230 deg. F. For the cold bath it should not exceed 112 deg. F. at the conclusion of the treatment.

The short-time treatments, such as the "A" and "AA", may not give a sufficient penetration of oil

even when poles are seasoned properly, while the "B" treatment is usually satisfactory when applied to seasoned poles. However, it is found frequently that many seasoned poles are resistive to treatment and cannot be penetrated sufficiently even by the "B" treatment. Some cedar poles have a hard shell immediately under the bark not always uniform in extent with the result that there is no uniformity in the penetration and one section will be found more deeply impregnated than another. This, of course, is unsatisfactory because the benefits of treating are proportional to the depth of penetration. To overcome this condition the process of puncturing or perforating pole butts has been devised.

The perforations are made in that portion of the pole's surface extending from one foot above to two feet below the ground line, making a total distance of three feet. There is still some question as to the depth and the circumferential and longitudinal spacing of the punctures. Since the sapwood of Western red cedar runs about $\frac{1}{2}$ in. thick, a penetration of $\frac{1}{2}$ in. seems proper for that species. The width of spacing will vary with different kinds of wood, but for cedar the detail of perforation spacing as shown in Fig. 410, p. 787, N.E.L.A. Proc. 1921, is followed closely with only slight modifications in certain instances. It has been found that this perforating process assists in driving the moisture out of partially seasoned poles and in producing a practically perfect absorption of creosote with a penetration of somewhat greater depth than the depth of the perforations.

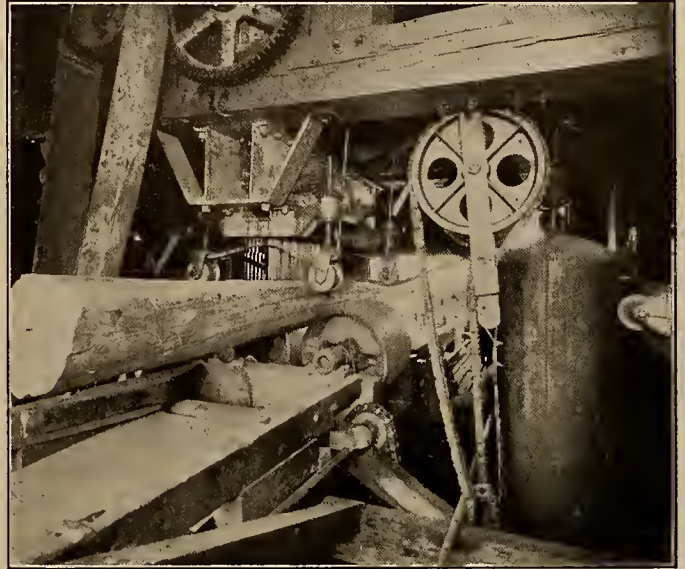


Open-tank pole-treating plant.

The first experiments in perforating poles naturally were made by hand. The device first used was a belt consisting of several thicknesses of heavy canvas into which wedge-shaped points $\frac{1}{2}$ in. long were fixed securely. This belt is placed along the pole and the flat side hammered so that the points are driven into the wood. The hammer method, which followed the belt method, consists in striking the pole with a broad-faced hammer in which spikes are set, and for a time this was considered an improvement in the process of perforating a pole. But as the demand for treated poles became more pronounced, methods were sought whereby the process of perforating could be speeded up. The result was a machine, of which several different types have been developed and are producing successful results. The two main types in use are the older "gravity drop" type and the more recent "spring level" type.

In the gravity-drop machine the puncturing is done by 42 iron bars $4\frac{1}{2}$ ft. long, 3 in. wide, and $\frac{3}{4}$ in. thick, weighing approximately 37 lb. each. At the bottom end of the bar is a detachable point holder so that the depth and spacing of the puncture can be regulated. Each bar works independently of all the others, and this takes care of the irregularities of the pole. The bars are raised by cams and dropped by gravity. The pole is brought under the bars on live rolls and then raised into position by a pneumatic hoist, this hoist providing at the same time an air cushion which takes up the shock when the pole is punctured. To avoid injur-

usually is applied. Various methods as outlined above are used, each giving good results depending on the type of pole to be treated and climatic conditions and type of soil in which it is expected to give service. The durable species such as chestnut and Western red cedar do not as a rule require a treatment throughout the entire length, but other species



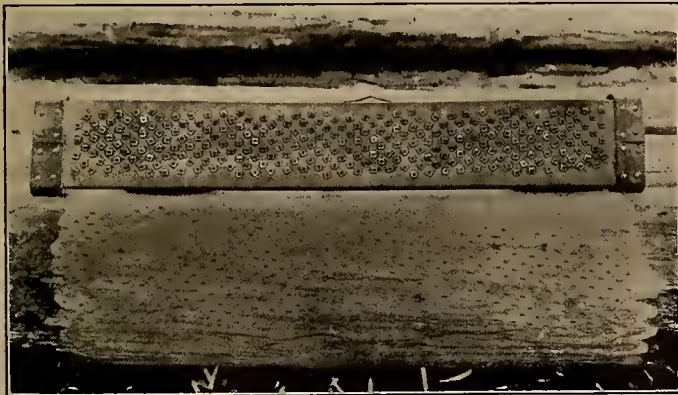
Gravity-drop machine for perforating pole butts.

such as the Southern yellow pine, Western yellow pine and Douglas fir which are not durable above the ground line require such treatment, with the result that the pressure treatment is used. The localized pressure method, which only recently has been tried, may be conducive of good results in the case of cedar poles.

The open-tank method Specification "B" is the treatment most commonly used on the cedar poles. It, in combination with the perforation of the pole butt, seems offer today the real solution to the efficient preservation of cedar poles. Although the method has not been in use sufficiently long to get any definite data as to the expected life by depth of penetration and uniform absorption such as made possible by the puncturing processes, the indications are that it should be possible to secure from 40 to 50 years of life out of a cedar pole thus treated.

Experience has shown that the benefits secured from preservative treatment depends entirely upon the depth of impregnation and upon the quantity of creosote that is injected into the pole. At the convention of the American Wood Preservers' Association held in New Orleans during January, 1923, a report was made by a committee which had been conducting an extensive study of the perforation treatment of poles. In reporting on the relative absorption of oil by perforated and non-perforated pole the committee found that the perforation treatment increased the consumption of oil by 58 per cent and that all additional oil was concentrated in the three-foot, perforated, ground-line section of the poles.

By the perforating of poles as described above green poles can be treated as thoroughly as seas-



Belt for perforating pole butts before treating.

ing the sapwood on the underside of the pole when the bars drop, two oscillating wheels, 24 in. in diameter and 18 in. wide, provide a sufficient bearing surface. The wheels are so constructed that no matter what position the pole is in or what taper it may have it will have a full 18-in. bearing surface.

Application of Methods

Experience has shown that the life of poles treated by the brush or other superficial methods is increased only slightly, and in most instances, not sufficiently to warrant the expense of such treatment. Such methods of treating are still used but when applied it should be only with due consideration to the character and permanency of the line into which the poles are to be placed.

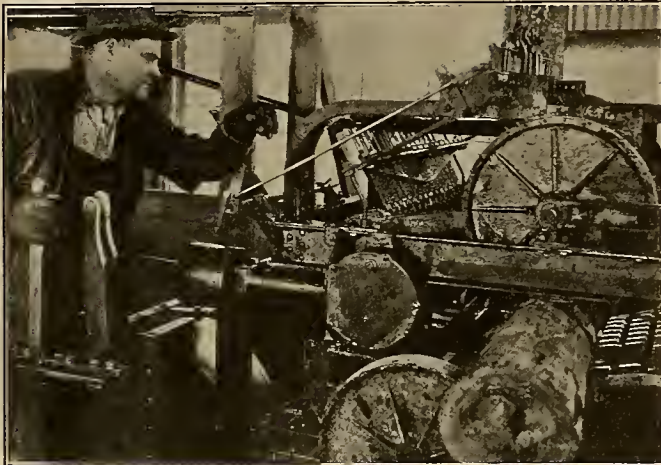
In general some type of impregnation treatment

oned poles, the principal difference being that it takes some days after treatment for the oil to travel through the fibers of a green pole.

Economies of Pole Treatment

When several methods of construction, differing in cost and expectation of life may be used, one of the most important questions to be decided in making a selection is, "Which method will be the best in the long run?" Sometimes a decision can be based entirely on cost and sometimes other factors may be present which will overbalance the cost, as in the case of pole treatment the primary factor is cost, but continuity of service is another factor that must be considered. The cost of treating poles varies considerably with the method of treatment, size of pole and cost of labor and material at time of treatment. In order to obtain data which would be applicable at any time the following calculations all have been made on the basis of the per cent additional cost of a treated pole over the cost of an untreated pole when set in place.

The common basis for comparing treated and untreated poles is on the annual cost of service, which includes interest on the investment, depreciation, maintenance and operation. The cost for operation



Spring lever machine for perforating poles.

is the same whether the pole is treated or untreated. The maintenance cost of a pole is the labor cost of resetting it, over and above the labor cost of setting the original pole. It is assumed that the pole is replaced without having been stubbed or otherwise repaired during its life. This cost must be spread over the life of the pole in order to obtain the annual maintenance cost. The interest cost depends directly on the rate of interest and the cost of the pole in place. The annual payment into a depreciation fund depends entirely on the type of fund.

In making the calculations for the curves, of which the accompanying are samples, the following assumptions were made: that the rate of interest is 8 per cent; that the depreciation is computed on a sinking-fund basis with interest at 4 per cent compounded annually; that the life of an untreated pole is of varying duration of 5, 10, 15 and 20 years; and that the labor cost of resetting the pole,

over and above the cost of setting the original pole, is a variable equal to 0.0 per cent, 100 per cent, 200 per cent and 300 per cent of the cost of an untreated pole set in place.

The total annual service cost for a treated pole must not exceed that for an untreated pole; otherwise the treatment of the pole does not pay in the long run. For an untreated pole the total annual service charge on the assumptions stated above is 8 per cent interest plus 8.33 per cent depreciation for 10-year life, or a total of 16.33 per cent of the first cost of the untreated pole in place. For a treated pole the total annual service charge must not exceed the same amount, but the annual interest is 8 per cent of $(100+X)$ where X is the maximum per cent of the cost of the untreated pole in place that may be paid for treatment. Therefore the amount which may be added to the replacement reserve per year for the treated pole is $.1633-.08(1+X)$, expressing all percentages in decimal fractions.

The sinking fund formula is $p = \frac{rs}{(1+r)^N - 1}$

where p is the amount to be set aside annually at r per cent interest compounded annually to accumulate s dollars in N years. Therefore letting $p = .1633-.08(1+X)$, $r=.04$ and $s=1+X$ we get $.1633-.08(1+X) = \frac{(1+X)}{(1.04)^N - 1}$

$-.08(1+X) = \frac{(1+X)}{(1.04)^N - 1}$. We may assume various

values for N , the total life of the treated pole, from, say 15 years to 35 years, and solve for X , giving the points on a curve which will show the maximum amount in per cent of the cost of an untreated pole set in place that may be paid for treatment of the pole without exceeding the total annual service cost of an untreated pole.

All the above is based on the assumption that the labor cost of resetting the pole is the same as the labor cost of setting the pole in the first instance. This is not the case except where a line is being rebuilt over a new route or some similar condition. Usually the labor cost of resetting a pole is considerably more than the cost of the first setting, due to the taking down from the old pole and placing on the new pole of crossarms, braces, guys, transformers or other fixtures, and also to the fact that it takes more man-hours for a gang of men to reset one pole probably several miles from the pole yard than it took to set the same pole when a construction gang was building the line.

Since the treated pole will have to be replaced less often than the untreated pole there will be an annual saving in maintenance, if treated poles are used, equal to the excess cost of resetting a pole divided by the number of years in a period of time during which it is necessary to replace one treated pole less than untreated pole, that is, if the untreated pole has a life of 10 years and the treated pole a life of 20 years and the excess cost of resetting over the original setting is \$20, the annual saving is \$20 divided by 20 years or \$1.00. For, in twenty years it will be necessary to reset two un-

treated poles at a total excess cost of \$40 but only one treated pole would be reset at an excess cost of \$20. This may be expressed mathematically.

$$\frac{Y}{N-10}$$

The annual saving= $\frac{Y}{N-10}$ where 10 is the assumed

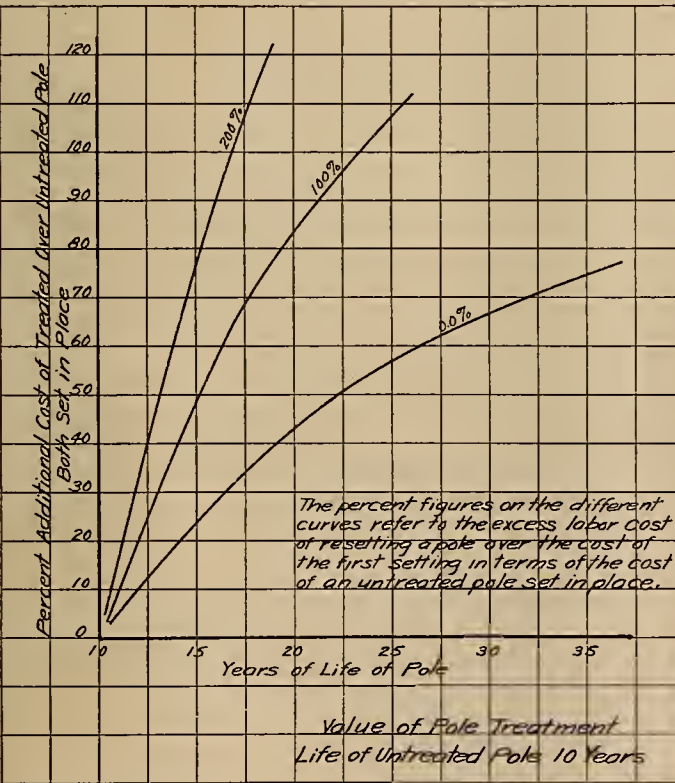
number of years of life of an untreated pole, N is the number of years of life of the treated pole, and Y is the excess cost of resetting a pole over the cost of setting the first pole.

Taking into consideration this saving in resetting cost the equation may be written for the value of p in the sinking fund formula as $p=.1633-.08$

$$\frac{Y}{(1+X)+\frac{N \times 10}{N-10}}$$

Using this value for p and hold-

ing Y constant first at 100 per cent, then 200 per cent, and finally 300 per cent, three curves showing the maximum per cent increase in cost of the pole in place that may be paid for a treated pole over an untreated pole were plotted. Then assuming a life



Curve showing value of pole treatment with estimated life of untreated pole as 10 years.

of an untreated pole to be 5, 15 and 20 years, similar sets of curves were made. It is believed that these sets of curves cover a range in the life of poles and cost of resetting wide enough to include practically all the conditions found in practice.

The set of curves as prepared have four variables, namely, the life of the pole untreated, the life of the pole when treated, the cost of treating the pole, and the excess cost of resetting a pole over the

cost of the first setting. In order to use the curves to solve any particular problem three of these variables must be known or assumed. Usually it will be necessary to assume the expected life of an untreated pole, taking into consideration the kind of wood and the location, and also the expected life of the same pole when treated by the method proposed. From past experience it will be possible to estimate approximately the excess labor cost to reset the pole over the labor cost of setting the first pole. From the curves the maximum per cent of the cost of the untreated pole set in place that may be spent for treating the pole may be determined and compared with the actual known cost and a decision made as to whether it will pay in the long run to treat the pole by the method under consideration.

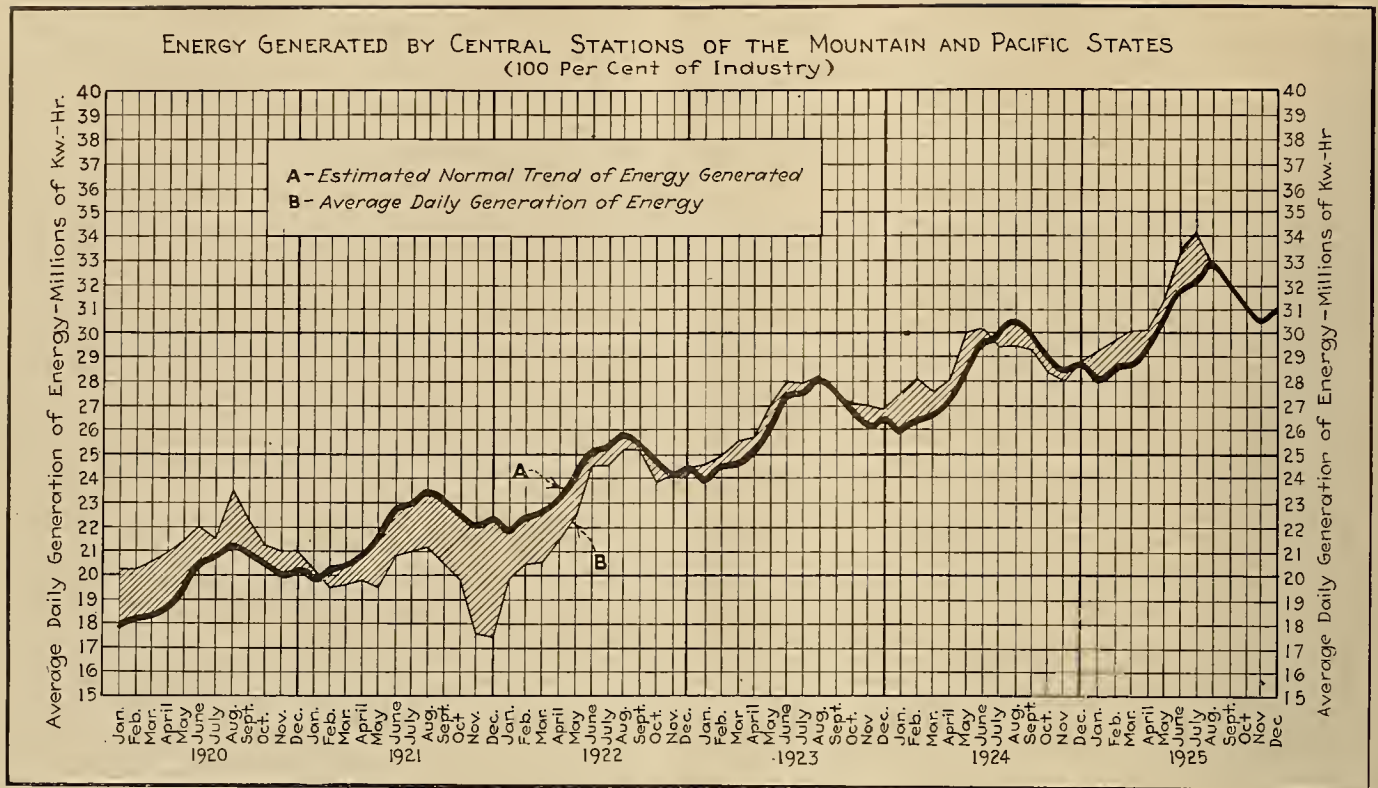
To take a specific example, assume that a line 10 miles long is to be built using 45-ft. cedar poles. The poles cost \$10 untreated and \$15 treated by one of the perforation methods. It will cost \$10 to set and frame the poles. It is expected that under the climatic and soil conditions peculiar to the line that the life of an untreated pole will be 15 years and that by treatment by the method proposed the life will be increased to 25 years. It is estimated also that it will not cost more than \$10 for the labor of resetting a pole so that no excess cost of resetting poles can be charged. Under these assumed conditions it is found that the maximum percentage of the cost of the untreated pole in place that can be spent for treatment is 25 per cent of \$20, or \$5, which is exactly the amount that the treatment costs. Theoretically, therefore, it will make no difference in cost in the long run whether the poles are treated or not.

If, however, it is estimated that it costs \$20 for labor to reset a pole in the line to replace one which has rotted away, then the excess labor cost of resetting over the first cost of an untreated pole set in place is 50 per cent and from the curves it is found that a maximum of 38 per cent of \$20, or \$7.60, may be spent for treating the pole in order to extend its life to 25 years. There is, therefore, no question but that it will pay to spend \$5 for treating the pole.

These curves may be used also for comparing the cost in the long run of two different types of poles; for instance, whether it is best to set fir poles with an expected life of five years or cedar poles with an expected life of fifteen years when the cedar poles cost \$20 set in place while the fir poles cost only \$10.

Central Station Industry in the West Showing Record Growth During 1925

THERE are many indicators of the growth of prosperity of the electric light and power industry, but without question the amount of energy generated indicates in the most accurate way the activities of the industry. In the final analysis it is the amount of energy generated and sold which is the significant factor in its prosperity.



The accompanying diagram gives the history of the activities of the central stations in the Mountain and Pacific States since the World War. An estimated normal trend in the amount of energy generated, based upon the activities of the industry during the past five years, also is indicated. With the exception of the years 1921 and 1922, which cover the period of the national industrial depression, the output of the central stations in the West has shown a steady annual growth. The last of 1924 witnessed activities slightly below the estimated normal for those months, but with this exception and during the industrial depression the industry has operated well above the estimated normal.

The present year is witnessing the largest growth ever recorded by the electric light and power industry in the West. Since the opening of the year the output has been several per cent above the estimated normal, and not until August did a drop take place. In August the industry was operating almost exactly at normal, based upon operations during the past five years, and there is every indication that

during September it was operating again above the estimated normal for that month.

In August of this year the electric light and power companies of the West generated 1,014,699,000 kw-hr. of energy, which was 11.7 per cent above the amount of energy generated in August, 1924. During the first eight months of 1925 these companies generated a total of 7,601,997,000 kw-hr., and it is estimated that during the present year a total of 11,370,000,000 kw-hr. will be generated, an increase of 870,000,000 kw-hr. over 1924.

In the country as a whole the August operations of the industry were about 2 per cent above the estimated normal for the month, and the accumulated figures for the first eight months of the year indicated that a total of 59,057,000,000 kw-hr. would be generated during 1925, an increase of 5,227,000,000 kw-hr. over 1924.

It must be remembered that all these figures are for the electric light and power industry only, and do not include energy generated by purely electric railway companies, Reclamation Service plants, or private industrial generating plants.

Tell the People*

By NORWOOD W. BROCKETT
Director of Public Relations, Puget Sound Power & Light Company, Seattle

IT is not necessary in talking to a group of public utility men to emphasize the importance of winning the good will of the communities in which we do business. Until very recently we all have proceeded upon the theory that any industry which gave the best possible service at the least possible cost, which treated its customers fairly, and which

entered into the civic life of the community, must in time gain the good will of the citizens of that community. Unfortunately this seems to be true of every line of industry except that of the public utility. We do not experience the same measure of friendly feeling towards our business which practically every other business conducted along legitimate lines enjoys. Nor is the reason for this hard to find. No other industry is subject to the same

*An address before the Pacific Coast Gas Association Convention, Portland, Aug. 17-21, 1925.

constant malicious attack on the part of unscrupulous politicians as is the public utility, and we have in the past made a very serious mistake in permitting these unfounded attacks to remain unchallenged and unanswered.

Then again, the very first contact which we have with our customers is an unfortunate one. A public utility furnishing gas, electric light and power, telephones or transportation is generally the only company furnishing a like service in a given community. The American people are essentially a nation of bargainers. We pride ourselves on our shrewdness in driving a deal, and for practically every commodity which we purchase we are at liberty to "shop around" until we find the article we desire at the price we are willing to pay. The public utility has taken from the people this privilege of bargaining. If we want gas or light service, or a telephone connection, there is generally but one place from which we can obtain it, and there you are asked to pay a certain specified price and to sign a contract in the drawing of which you have not been consulted. Subconsciously the average individual resents this, and immediately he is impressed with the fact that this particular public utility enjoys a monopoly and that he must submit to whatever terms it cares to dictate. This unfriendly attitude on the part of the customer fanned into open indignation by the political demagogue, combined with our neglect to place true facts of our business before the public, in my opinion, has led to most of our troubles.

In getting before the public the truth about the public utilities and the manner in which they conduct their business, I know but two media—the printed and the spoken word.

Of the two I believe the spoken word to be far more effective, and in spite of many assertions to the contrary we can reach practically all of our customers through the spoken word. It can be done only in a limited way by public speaking at commercial clubs, noonday luncheon clubs and similar organizations, but it can be done in a very extensive way through the tremendous number of employees in the public utility business.

It has been my experience that the average employee desires to defend his company and to correct mis-statements concerning it. But when he attempts to do so he generally finds that he has such a limited knowledge of the company's operations that his defense is very weak. Group meetings of all the employees of a public utility should be held, at which each detail of the company's business should be explained fully to them, and copies of the explanation distributed so that they can be taken home and studied. Only one topic should be taken up at each meeting, and it should be explained by that member of the company who is known to the employees to be fully conversant with that particular subject.

The media for the use of the printed word are many; chief of these is the newspaper. The paid advertisement which frankly is published to inform the reader as to some of the problems of the company, or to correct mis-statements made concern-

ing it, are read and, if true, are believed. In addition the newspaper is invariably willing to print any real news item furnished by the utilities. For years we have neglected this source of publicity. We have become so absorbed in the building of plants and the extension of service that we have forgotten to tell the people, through the newspapers, what we are doing to help build up those communities we serve.

What are the things that each of our employees should know, and what are the messages that we wish to take to the people?

Ownership—There still exists in the minds of a great many people the idea that the average public utility is owned by a few wealthy men, residing somewhere on the Atlantic seaboard, who are getting immensely wealthy from the excessive profits taken from the people. Make them realize that the average public utility is owned by thousands of stockholders in every walk of life who have invested their savings to make the service possible, and that whatever profits are made from the service are returned to these thousands of stockholders in the shape of dividends. The fact that most of the companies today are selling their stock to their customers is doing much to remove this erroneous impression of ownership.

Regulation—The operations of the public utilities in the past have been shrouded in mystery. The impression has been created that there is something unusual and underhanded in their manner of conducting business. As a matter of fact, the conduct of the business of a public utility does not differ from that of any other corporation, except that the utility is regulated. Not one person in a thousand knows that we are regulated, and the one who does know has no conception as to how this regulation is accomplished, or why. Explain to the people that the furnishing of a public service is generally a natural monopoly; that in times past some few companies took advantage of this natural monopoly, either by neglecting to give the people the service to which they are entitled, or by charging an unreasonable rate; that since we all are dealing in a commodity which has become almost a necessity the people through their various legislatures, have created the "regulatory body" to stand between the natural monopoly and the people who desire to use its service. Practically every state in the Union created a commission with full power to regulate both the service given and the rates charged by these public utilities—a body to which any consumer could appeal if he felt himself aggrieved. Explain that we are permitted to charge a rate sufficient to earn only a fair return in the shape of interest and dividends upon the actual value of our properties as determined by the commission's own engineers; that the rate is based entirely upon the appraisal of such engineers; that the commission is not concerned as to the outstanding stocks and bonds of the company; and that any statement that, under regulation, a public utility is permitted to earn a return upon so-called watered stocks is absolutely untrue.

Rates—I am not as familiar with gas rates as with those for light and power, but I do know that while the average cost of living in the United States has increased 65 per cent since 1914, the cost of electric energy steadily has decreased. I know that the average residence bill for electric service, including all the numerous socket appliances, such as percolators, vacuum cleaners, flat irons, and so on, is less than \$25 a year—less than \$2 a month—less than the cost of ten gallons of gasoline. We are constantly explaining to the people of our district the reason for reduced electric rates, since the municipal plants in those districts where we have municipal competition are prone to take all the credit, entirely overlooking the fact that the same reduction in rates has been practically uniform throughout the entire United States.

Service at Cost—There has grown up in this country a belief that gas, electric energy, telephones and transportation should be furnished the people at cost. The people are being told that for public necessities of this character they should receive "service at cost," and that this can be obtained only through state, municipal or government ownership. The strange part of the agitation seems to be the lack of knowledge on the part of the people that today they are receiving this "service at cost." Under state regulation that is all that a public utility is permitted to charge for its service—the cost of furnishing the service, plus the cost of the money invested to make that service possible.

As I explained before, the average public utility is not considered as a part of the business life of a community, but as something alien and foreign which has fastened its tentacles onto the community, and which the community would gladly throw off if possible. This is the impression which has been created by the demagogue and is probably the most difficult one to remove. Tell the people how much you pay each year in taxes, the number of people in your employ, your annual payroll, the amount you spend each year in improvements and betterments to your system, and how these improvements go upon the tax rolls again to help carry the tax burden. Tell them the amount of money spent by the company each year with the merchants and manufacturers within the district, and ask them frankly why it is that this particular industry which is doing its full share towards building up the community cannot be permitted to operate peacefully and without being the continued object of attack of a certain type of politician.

There is no one spectacular thing which any person can do to improve the public relations of his company. In no company can it possibly be a one-man job. The result can be obtained only after months and years of persistent effort on the part of every member of the organization, first by so conducting the business as to warrant the good will of the people, and second by taking the public fully into your confidence and by permitting no lie or malicious misrepresentation to go unchallenged.

Annual Report of the President of the P.C.E.A.*

WE open today the fourth annual convention of the Pacific Coast Electrical Association. This is our ninth meeting since organizing the Pacific Coast Division of the National Electric Light Association held its first convention at Riverside in 1917. Due to the fact that we are particularly fortunate this year in having the National Convention in San Francisco at this time, our Pacific Coast Convention will be limited to today's meeting. The time will be taken up by the election of officers for the ensuing year and for the reading of reports by section and committee chairmen.

With the National Convention in San Francisco, it will be possible for large numbers of member company employees to attend the most interesting and instructive sessions of the National Sections. It is hoped that this opportunity will be taken advantage of and that a particularly large attendance will be present at our meetings for the remainder of the week.

Present Election Method

The present administration of the Pacific Coast Electrical Association had the advantage of an early start this year due to the change in the method of election which was inaugurated at the beginning of the year. This year the election was held at the beginning of the convention and gave the incoming president an opportunity to confer with the prospective committee appointees during the convention. This opportunity was appreciated and taken advantage of with the result that the committee work this year was organized effectively at an early date.

* Due to the limited amount of time available for the annual meeting of the Pacific Coast Electrical Association, the reading of the President's Report was omitted from the program on June 15, 1925.

Executive Committee

Five meetings of the Executive Committee were held during the year. The first was held at Coronado on June 19, 1924. The organization of sectional work was discussed at length. The matter of having a paid secretary for the Association was recommended and discussed.

At the second meeting in San Francisco on Aug. 14, 1924, the combination subscription membership plan, submitted by the Journal of Electricity was discussed and adopted.

The third meeting of the Executive Committee was held in Los Angeles on Nov. 13, 1924, at which time the budget was discussed and approved as submitted.

The fourth meeting was held in San Francisco on Feb. 19, 1925. At this meeting plans for the National Convention to be held in San Francisco, June 15, were discussed in detail.

At the fifth meeting of the Executive Committee in Los Angeles on May 14, 1925, the functions of the California Electrical Bureau were discussed. The importance of studying electric transportation, by one of the Association's committees, was brought up and after a thorough discussion the matter was referred to the chairman of the Commercial Section.

Proceedings

At the beginning of this year's activities, arrangements were made with the Journal of Electricity whereby all members of the Pacific Coast Electrical Association received as a part of their membership a yearly subscription to the Journal. The Journal in turn has published all the material submitted to it by the Association which would be of interest to the members of the Association. This includes the publication of the

November 1, 1925]

papers of the various sections prior to their being read at the Convention. The arrangement with the Journal of Electricity has been particularly satisfactory and we feel that it has been very helpful to our members to have had a personal copy of the Journal at their disposal. In addition to this the proceedings in bound form will be printed as heretofore.

Work of the Committees

The committee work has been particularly satisfactory during the past year. We believe that too much emphasis cannot be laid on the advantage which accrues through the present election method which makes it possible for the plans for the coming year to be formulated during the convention period. It is hard to estimate the time gained and efforts saved by this procedure. The Courteous Service Club Committee (organizer of the Smiles Club) of the Public Relations Section has followed up to advantage the very effective work which it inaugurated last year. We feel that this movement merits the support of our Association because it is a distinctive undertaking which endeavors to mold the attitude of our industry for better public relations. The papers of the Technical Section continue to maintain the high standard which has heretofore been set by this section. Substantial contributions have been made toward the solution of problems encountered in the interconnection of large power systems.

The activities of the Commercial Section have been particularly noteworthy. The work of the Transportation Committee deserves the earnest consideration of all of us. The innovation of the Lighting Committee in holding the Lighting, Electric Truck and Industrial Heating Schools is an outstanding accomplishment. The Lighting School enrolled a total of 103 in the schools in Los Angeles and Oakland. These schools finished with a remarkable attendance record of 96 per cent.

The Association has supported and cooperated with the National Committee on the Relation of Electricity to Agriculture. This committee now has passed from a formative stage to the active investigation and research into the present and potential uses of electricity in agriculture. In this investigation of the potential possibilities of the utilization of electricity on the farm, we should set as our goal the attainment of greater economic stability in the agricultural industry. We urge the continued support of this committee's work by the Pacific Coast Electrical Association.

This year the valuable and constructive work of the Publicity Committee was rewarded by being created a section, thus giving the deserved and merited recognition which it has earned.

We feel that the committee work of the Association is probably its most important function and that in order that the membership receive the maximum benefits, that the personnel of the committees should be changed so that best results will be obtained not only by the members but also by the Association itself. It is felt, however, that practice of carefully choosing a vice-chairman with the thought in mind that this vice-chairman will succeed to the chairmanship the following year, is a practice which should be continued. In this way our committee work will be given proper continuity from year to year and we will have a chairman qualified by experience and training to keep up the high quality of leadership which has been displayed by the chairmen during the preceding years.

National Association

This year the presidency of the National Electric Light Association went to a Western member. This resulted in increased cooperation between the officers of the national body and the Pacific Coast Electrical Association. The local committees have been made to conform with the line-up of the national committees and in this way better understanding has been promoted between the two committee groups. It has made it possible for them to work along the same lines of endeavor to a common purpose. This happy understanding between the national body and our Association has culminated in the National Convention being held in San Francisco. This, indeed, will be an inspiration to our Association, to promote the common cause.

During the year many of our members have attended National committee meetings and we feel that the benefit therefrom has been mutual. Excellent results were obtained at the Commercial National Section meeting

which was held in San Rafael, Nov. 19-21, 1924. While we appreciate that most of the member companies are east of the Rocky Mountains, it is certainly encouraging to have an occasional National committee meeting and now a National Convention on our West Coast. These contacts resulting in better acquaintanceship between the East and the West are bound to promote an even better conception and understanding of our mutual problems.

Public Relations

We believe that the public utilities of the West are coming into their own with regard to public relations. During this year the people of California again voted down the so-called Water and Power Act by an overwhelming majority. The problems of the public utilities are becoming better known to the public in general. It means ever continuing the educational work which has been started. The place which we now hold in the public mind can only be maintained in its present staunch position, by being sure that the public continues to have the facts. The accomplishments of the public utilities, particularly in California, during the last year can only be the subject of commendation when all the facts are known.

The year 1924 marked the eighth successive year of subnormal precipitation throughout the whole state. In spite of this unheard of shortage of water, curtailment of power was cut to a minimum and the utilities shouldered the enormous obligation of going through the stress of the abnormal conditions without increasing the rates. When these facts are known, such achievements are bound to be reflected in the esteem of the public.

Never before have public utilities' securities stood as high on the exchange. It is the result of the popularity of these stocks as an investment. The investing public have come to realize the soundness and security of the business in which we are engaged. The opportunities for good public relations rests in our own hands and we feel that through the Pacific Coast Electrical Association, we have the opportunity of pooling our individual experiences for the benefit of all our member companies.

Customer Ownership

We are all convinced that public ownership by means of customer ownership is the basis for our economic and financial success. This step was initiated in the West and has reached its highest state of development in our Western utilities. Customer ownership carries with it, also, its definite responsibilities. It makes private management definitely responsible for its acts, a thing which does not exist in the case of political ownership. The happy combination of public ownership through customer ownership, with private management held to its responsibilities coupled with proper government management has been worked out to a most successful conclusion in the West.

Interconnection

In the West we have long taken advantage of the possibilities of interconnecting the systems of our various companies when it is to the mutual advantage of all concerned. The remarkable accomplishments of last year were made possible by the system of interconnection which has been in vogue with us for many years past. We have possibly said too little about this thing in the past, which now in some quarters is being heralded as a panacea for all the ills of power transmission. Good business and fundamental economic reasoning long ago brought us to the continued use of interconnection.

Employees

Two years ago the Pacific Coast Electrical Association inaugurated a Personnel Committee. Last year this was followed by the National Electric Light Association starting an Industrial Relations Committee. Many of our larger companies are realizing the importance of the human side of our industry and it is with a view of bringing this most important matter to the attention of us all that the Committee of Personnel was originally instituted. Our whole public relations program is so tied up with the maintaining of a properly trained staff of employees that the two are inseparable. We recommend to this committee a most careful consideration of the matter of employee training in our industry.

Secretary

The services of our secretary, Samuel H. Taylor, have been invaluable to the whole electrical industry. We are particularly gratified that it has been seen fit to put this office on a remunerative basis and in this way show the appreciation which the Association owes to the effective and efficient work of Mr. Taylor. It has been his work which from year to year has ironed out the rough spots in our Association's work and

brought to it a continuity of effort. The success of our Association this year, which I feel has been signal, is due to the excellent cooperation between the officers, sectional chairmen, committee chairmen and committee members. In closing my report I desire to extend my heartiest congratulations to you for the success of this year and my deep appreciation for your untiring support.

FRANK A. LEACH, JR., President

Report of the Secretary of the P. C. E. A.

IN formulating this, my fifth yearly report of the activities of the Pacific Coast Electrical Association, I do so as the sole continuing official for such period of time.

The belief is strong within me that very few of the executives of our Class A members have a definite understanding or knowledge of the organization which this association has developed during the past five yearly administrations and the story should be told at this time in the secretary's report.

Our committee set-up, which includes the following sections and committees,

Public Policy Section	Accounting Section
Public Relations Section	Purchasing and Stores
Publicity Section	Section
Technical Section	Personnel Committee
Commercial Section	Insurance Committee

numbers in personnel 650 members, participating in the activities of their respective sections during the year; in addition should be added the elected and appointed officials of the organization, numbering eighteen members.

The above-mentioned sections are made up of committees covering every branch of the electrical industry, and membership on these committees is sought by individuals at this time rather than solicited by the respective chairmen of such committees, as was necessary in years past, to complete their respective personnel.

Our membership list totals approximately 2,600 of all classes, from which it will appear that 25 per cent of the individual members are participating actively in the various committee functions carried on by the association.

The work accomplished, and which could be expanded largely by this splendid organization, is handicapped by the limited financial resources at its command. These resources are secured solely through appropriation by the national executive committee, the largest amount received from such source being \$18,500 per year for the past two years. But one salary has been paid out of such funds, until July 1, 1924, when the secretary's position was placed on a small financial basis.

It would be difficult for one in my position to differentiate in the importance and conduct of the work performed by the various sections under their respective chairmen during the past year.

The several committees of the Technical Section have performed much work of great importance to the industry, and all of which has a direct bearing on reduction in investment and operating costs, as follows:

Meter

Education of metermen will tend to increased efficiency.

Relay calibration will result in improved reliability. Study of low first cost methods of high tension metering.

Study of meters to prevent loss of revenue through over-metering.

Apparatus

Study of oil circuit breakers already installed for purpose of increasing their rupturing capacity.

Study of oil in effort to select one that will serve for all oil-immersed apparatus.

Study of relays and relay applications to prevent loss of revenue due to unnecessary interruptions and damage to equipment.

Fire-fighting equipment for protection of electrical apparatus.

Hydraulic Power

Hydroelectric plant layout gives industry benefit of best practice in selection and arrangement of plant equipment.

Analysis of plant outage due to hydraulic troubles.

This committee for two years past also has formulated and written the report of the hydraulic power committee of the national association.

Prime Movers

Studies of fuel oil burning and condenser troubles will affect improved steam plant economics.

Underground Systems

Study of duct line temperature and high voltage cable both of which will permit more efficient use of underground cables and will ultimately lead to higher voltage and greater capacities.

Overhead Systems

Revision of General Order No. 64.

If accepted by the California Railroad Commission, will mean saving through reduction in pole height and simplification of construction.

Studies by pole committee will lead to economy in steel poles through standardization and savings in wood poles through data on strengths and treatments.

Transformer standardization will mean lower erection costs and reduced stocks.

Testing insulators in service and hot line maintenance will mean reduced operating costs.

Accident Prevention

This committee has functioned actively during the year, and in its report has outlined the subjects for the coming year, as well.

1925—First Aid Training; Code of Safety Rules and Safe Practices; Company Organizations for Accident Prevention; Accident Prevention Course for Linemen; Safe Practices; Safe Tools and Devices; Safety Bulletins.

1926—Accident Statistics; Best Form of Safety Code; Best Form of Organization; Accident Prevention Courses; Interchange of Important Safe Practices; Safe Tools and Devices; Distribution of Safety Bulletins.

The California Institute of Technology appealed for financial assistance through the Technical Section to enable them to carry on experimental work to determine evaporation losses in reservoirs, with the understanding that the results of such tests would be published in the Pacific Coast Electrical Association's yearly book of proceedings. After careful investigation by representatives of the section, an appropriation of \$400 was authorized by the executive committee to aid in this work.

The Commercial Section has held five section meetings during the year, the San Rafael meeting in November having been of the national section, the Pacific Coast section acting as hosts.

The Appliance Bureau has submitted two reports, as follows:

1. Dealer's Plan for Selling Small Appliances.

2. A Merchandising Plan for Central Stations.

The second report has been discussed in much detail, but owing to the diversity of opinion as to the central station engaging in such undertaking, no definite recommendation has been made, the committee merely outlining plans which may be employed should a central station decide to enter the merchandising field.

The Customer Relations Bureau has performed a most constructive piece of work in the preparation of a manual to be studied by employees in the electrical

industry, containing valuable suggestions as to the employees' conduct in dealings with the patrons of Class A member companies, and which, if read and acted upon with intelligence, inevitably will result in improved public relations. Copies of this manual have been mailed, personally addressed, to our executives, and if they have not digested the same up to date, we suggest that they do so at this time, for the opinion has been expressed repeatedly that this committee has produced something of real value to the industry as a whole, and practical use should be made of it through publication and distribution to the employees of our member companies.

The Lighting Bureau has carried forward three activities: first, a tie-in with the Division of Agricultural Engineering, University of California Davis Farm through farm bureaus, and similar meetings throughout the state; second, a follow-up of the national Home Lighting Contest, capitalizing upon the publicity gained through such contact, and bringing about a more widespread knowledge of what good lighting means, as well as affording an opportunity for dealers and others interested to promote merchandising of lighting appliances. The personnel of the California Electrical Bureau has been utilized considerably in this specific activity.

Interest also has been stimulated in the employees' Home Lighting Contest. The Lighting Bureau has given a \$50 prize to the winner, and a \$25 consolation or runner-up prize, in addition to the company and national association awards.

The lighting schools conducted in Los Angeles and San Francisco have been an outstanding accomplishment of the Commercial Section the past year. The basis of these schools was the national association's lighting sales course, part 2, and designed primarily to give up-to-date, practical information and data on lighting to those who come in actual contact with lighting installations, namely: the electrical contractor or his estimator, together with that branch of the industry which contacts the contractor, namely, the jobber-salesman.

The limit of participants in the schools was placed at 50, divided as follows:

Electrical contractors.....	25
Jobber-salesmen	10
Architects and engineers.....	10
Central station men.....	5
—	—
	50

The actual enrollment at Los Angeles and Oakland was as follows:

Electrical contractors.....	38
Jobber-salesmen	30
Architects and engineers.....	5
Central station men.....	20
Fixture manufacturers.....	6
Miscellaneous	4
—	—
Total.....	103

The attendance at the ten sessions, alternating afternoon and evening, for a two-weeks' period, averaged 96 per cent.

The actual cost of this activity slightly exceeded the original appropriation of \$500 made to cover by the previous administration of the section. Many letters of a commendatory nature have been received from the participants in this school work. I quote from one only, written by a member of a well-known architectural and engineering firm:

I have just completed the course on illumination given by the Pacific Coast Electrical Association. It has been enjoyable to attend the classes and what I have learned will, I know, prove of real value in my work of writing specifications. I hope that your organization, or others of a similar nature, will soon find it possible to give other courses of the same general nature—one on electric heating or domestic uses of electricity—would be of particular value.

Provision should be made within this organization to carry forward such work, as well as similar activities, which constantly are being developed by our committees.

The work of the Transportation Bureau has been devoted largely to the development of the use of electric trucks, and a most successful electric vehicle school was held in San Francisco during June, 1925.

The Power Bureau has submitted comprehensive reports on "Electrification of the Dairy Industry," "In-

dustrial Heating," "Competitive Power in Industry," and "Sale of Power to Hotels."

The Electric Cooking and Heating Bureau's activities include metered water heating in California and electric air heating.

The recommendation also is made that the instruments now being employed by the Northwest association in the study of range load be secured by this association next year, enabling this committee to make a detailed and careful analysis of the value of an electric range and water heater load.

The activities of the Public Relations Section have been confined largely to the Courteous Service Club, otherwise known as the "Smiles Campaign." This work has attracted considerable attention beyond the jurisdiction of this association, and the recommendation is made by the committee having it in charge that the national association make of it a national activity. If it be decided to continue as a division activity during the coming year, it should be under the charge of the industrial relations committee of the Public Relations Section and contact directly with the national association through the chairman of such committee, who becomes a member of the national executive committee of the corresponding national committee.

The remaining section and committee activities have been carried forward in the same thorough manner which characterizes those we have specifically mentioned heretofore. Their work, however, is directly applicable to our Class A members' operations rather than for public use and will be brought directly to their attention through the committee personnels.

In the foregoing I have endeavored to give a clear insight of the educational and promotional activities of the Pacific Coast Electrical Association during the past year, which is true of the organization from year to year, except that interest in the work by those engaged in it through membership on the committees has increased each succeeding year until the past year when, as previously stated, 650 members were engaged actively in the work.

Under such conditions, why the necessity for the further maintenance of another organization endeavoring to work along similar lines and receiving 60 per cent of its financial support from our Class A members, while this organization of real accomplishment is retarded in its work and development through lack of necessary funds with which to carry on?

Section 2, Article 2, of the constitution of the Pacific Coast Electrical Association reads as follows:

"It shall be entirely self-governing and autonomous, although affiliated with the National Electric Light Association."

The authors of this document no doubt foresaw the necessity for an organization of broader scope in its activities than is provided for simply as a geographic division of the national association, and, from the writer's present viewpoint, the time for such broadening of our activities is now upon us.

As chairman of the membership committee it is my pleasure to advise of a very considerable increase in new individual members, Class B.

Contributing reasons for this increase are to be found in the forty-eighth convention of the National Electric Light Association held in San Francisco, as well as the inclusion of a yearly subscription to the Journal of Electricity to all of our members, in addition to the Bulletin.

We regret to advise that our membership lists contain too few Class D and F members, considering the fertility of the field covered by this association in respect to such members, Class D embracing companies or firms engaged in the manufacture of electrical apparatus or equipment for the production or use of electrical energy, and Class F covering companies or firms of electrical jobbers, contractors, dealers, electrical or mechanical engineers, etc., who are interested in advancing the use of electrical energy.

Recognizing the desirability of organizations for specific branches of the industry, we maintain that allegiance is due also to the greater one, embracing as it does, all branches of the industry and deriving its principal support from the central station organizations, the foundation of the industry.

SAMUEL H. TAYLOR, Secretary

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Fourth Unit Added to Two Original Big Creek Plants

Interesting Construction Features Involved in the Addition of Generating Units at Two Pioneer Plants

By R. C. BOOTH, Assistant to Resident Engineer, Southern California Edison Company, Big Creek, Calif.

On the Big Creek project of the Southern California Edison Company the original installation made about twelve years ago included three dams for the storage of water in Huntington Lake reservoir and power houses Nos. 1 and 2. Plant No. 1 is supplied through about two miles of pressure tunnel and flow pipe from Huntington Lake and 4,000 ft. of penstock, creating 2,130 ft. static head. The water from the tailrace of power house No. 1, with the addition of a few Big Creek tributaries having an early runoff, is carried through 4.5 miles of pressure tunnel, 12 ft. in diameter, and nearly a mile of penstock to power house No. 2 which operates under a static head of 1,860 ft.

In each of the nearly identical buildings were installed two 16,000-kw. generators driven by double-overhung impulse wheels. Room was provided originally for a third machine which later had been added.

During the latter part of 1924 and the first three months of 1925 a temporary end in each building was removed and an extension made bringing the buildings to their ultimate size, a four-unit installation. The fourth unit at No. 2 has been in operation since April 1 and the new machine for No. 1, which is 50 per cent larger, was completed about three months later.

Practically all work on the extension of power house No. 2, except the building of the camp and excavating for the foundation, was done during the past winter under alternate freezing, thawing, and stormy conditions. Water for mixing concrete was heated in an old donkey boiler. In the coldest weather before pouring concrete the forms were washed out with hot water and thin slabs and walls were kept warm for a few days with warm water or "salamanders" under canvas.

A very good grade of concrete aggregate was obtained from the dump at the adit of tunnel No. 8 which carried to a lower plant the water from the tailrace of power house No. 2. The muck was crushed and screened at the dump and hauled about a mile in a 4-yd. auto dump truck to the mixing plant bunkers, which had a storage capacity of 100 cu.yd. Concrete was mixed in a ¾-yd. mixer elevated in a wooden tower and placed with buggies.

The installation of the hydraulic and electric equipment required seven weeks, since which there has been no necessity for a shut-down. After the bearings had been set the shaft was lifted into a vertical position by the

crane from a horizontal position on the floor, dropped into place, and centered through the rotor which had been set down in the transformer pit and timbered up level with the machine floor. The rotor had been heated to give proper shaft clearance in about five hours time by means of a coil of heavy aluminum cable wound circumferentially, insulated with asbestos, and energized at 480 volts. As soon as the rotor had cooled and shrunk tightly onto the shaft the unit was cribbed up on the generator floor and the impulse wheels pressed on with a large hydraulic press.

Concrete materials for the construction of the penstock were obtained from a dump at the outlet of Shaver tunnel. This dump is on the hillside about 500 ft. vertically and ¼ mile horizontally above the head of the penstock. A crushing and screening plant at the foot of this dump was supplied by a dragline scraper. Aggregate was lowered by hoist and cable along the slope in a 4-yd., 3-ft. gage car to a depression in which a tunnel trip of 500 cu. yd. capacity had been built. From here the material was drawn in a steel-bottom, batch dump car on a 3 per cent ascending grade to the mixer hopper, the empty car returning to the storage by gravity when the hoist brake was released. One man rode the car, loading through the radial gates in the trap and charging the mixer at the other end of the trip. A double-drum hoist handling the batch car also operated an elevator for hoisting cement to the charging platform. The hoist operator also fired a boiler from which hot water was piped through a storage pile to the mixer. Three men each were required to operate the crushing and the mixing plant.

Concrete was mixed in this central plant and delivered to penstock anchors and piers over the main, standard-gage incline on a strong-back flat car with four 1-yd. bottom-dump, steel-car bodies mounted on trunnions so that they rode level irrespective of grade. A small water tank also was provided on the up-hill end of car. By mixing concrete very dry and tempering it in the chute while placing, separation of materials was avoided and the mixture could be hauled any distance without difficulty in getting it out of cars.

With the exception of some of the bends the penstock was of lap-welded pipe with Van Stone flange joints having grooves in one face for round

rubber gaskets. The pipe tapers from a 42-in. diameter to a 36-in. diameter and splits into two 24-in. lines just outside the power house. Most of the bends are cast steel elbows 8 ft. long with an expansion joint in each end. Runs of pipe are anchored approximately midway between bends. A cast iron saddle bolted into the concrete anchor, which is entirely below the pipe, holds a heavy U-bolt around the pipe. The pipe has a riveted shear plate butting against the uphill edge of the iron saddle and carrying the longitudinal component of the weight of the pipe. A few slight vertical bends are made up of the regular welded sections of pipe with a solid "dutchman" at the lower end and a split or adjustable "dutchman" at the upper end. This construction is very handy for angles of no more than 5 deg., beyond which it is advisable to use elbows. A maximum of about 2 deg. may be obtained per joint with "dutchmen."

The pipe sections, nominal length 30 ft., were delivered two to a load on strong-back cars to several unloading stations along the main tramway where they were transferred by a gin pole to a steel sled which slid along on wooden skidways straddling the concrete saddles. Pipe and sled, both of which were held by a cable bridle, were lowered into place by an electric hoist. Saddles were poured 1 in. below grade and grout-filled after the pipe was placed. Two layers of graphite packing were inserted.

The skidway was built in a temporary manner of small-dimension salvaged timber and was taken up as the pipe was laid. Three portions of the penstock were on a rather light grade, and pipe was rolled directly from the main incline car into the saddles. After part of the bends had been set and the connection made at the power house the bulk of the pipe was placed in two weeks, indicating that this type of pipe and method of placing are quite satisfactory. The flange joints are somewhat more expensive but have a number of very decided construction advantages over the bump-joint type. Riveting, calking, fitting, and the necessity of working inside the pipe all are eliminated through the use of flange joints. Experience seems to indicate that these advantages more than offset the added weight and cost of steel pipe.

London has sixty light and power plants competing for the electrical business of the world's largest city. Chicago, with one company, generates and sells twice as many kw-hr. as London's sixty companies. Chicago's per capita consumption is six times that of London. And it costs Chicagoans only a trifle over half as much for their electric power as is the London charge."—Delta Star.



INTERESTING phases of construction incident to the installation of a fourth unit at Big Creek No. 2. (1) Looking down penstock No. 2. (2) Raising the shaft preparatory to dropping it into the rotor. (3) Crushing and screening plant, using nearby tunnel tailings. (4) Pouring penstock anchors. Vertical angles in penstock, (5) cast-steel elbow, and (7) one made up of short welded-pipe sections. (6) Lowering a penstock section into place.



Power Company Communication Systems — I (b)

Standardized High-Line Telephone Protective Equipment Applied to Cables and Indoor Switchboards

By H. N. KALB*, Telephone Engineer, San Joaquin Light & Power Corporation,
Fresno, Calif.

Where telephone relays or similar apparatus are to be connected direct to the line on the station side of telephone insulating transformers a further protection is needed between wires. Use is made here of a special protection block having the appearance of carborundum. This block gives a very high resistance short between wires at normal voltage, but at higher voltages the current is sufficient to blow the fuses. This does away with the usual trouble of having relay or other coils punctured at the terminals during a severe disturbance.

If the lines are to enter the building through a telephone cable (in which the wires are paper insulated, they first

cable pairs may be such that when combined with the inductance of the connected windings a near-resonant condition may be experienced during a disturbance. If the above-described protective equipment is properly installed a modern telephone switchboard may be connected to the cable and operated with perfect safety to the apparatus and to the operator.

The whole protection scheme used ahead of the telephone cable is shown in Fig. 8, and the protection between the long run of cable (in this case 4,000 ft.) and the switchboard is shown in the far corner of the room (Fig. 9). To the left in Fig. 9 is shown a motor-generator ringing set mounted on a table, while attached to the left-hand end of the table is an interrupter and pole changer which has for its supply the 48-volt battery (Fig. 10) used as the main battery supply for the switchboard. To the extreme right of Fig. 10 is shown an emergency battery consisting of four 12-volt automobile storage batteries in series. These two batteries are charged alternately by a 10-ampere mercury-arc rectifier shown at the center in Fig. 9. At the extreme right in Fig. 9 is the power panel controlling the batteries, the charger and the ringing set. The interrupter and pole-changer ringing set is equipped with a relay so arranged that the motor-generator ringing set (the motor of which is connected to the 110-volt lighting circuit) is normally supplying the ringing current, but if the supply to the motor should fail this relay connects the pole changer which then operates until the motor again starts.

Referring again to the protection between the open-wire lines and the telephone cable as shown in Fig. 8, it often happens that a fuse or a heat coil will blow and not be noticed by

the substation operator and thus leave the line out of service. To prevent this all fuses are connected to one alarm circuit and all heat coils are connected to another alarm circuit. Thus the operator knows at once when either a fuse or a heat coil has blown. As he walks in front of the equipment he may easily see which one is open, as

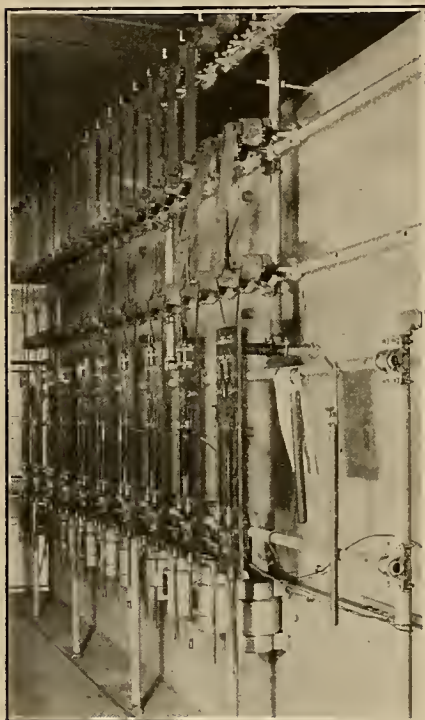


Fig. 8. Telephone protective equipment used between terminus of 4,000-ft. cable and switchboard.

must pass through another fuse device known as a heat coil which should blow instantly with $\frac{1}{2}$ ampere and in about $\frac{1}{2}$ min. at from $\frac{1}{4}$ to $\frac{1}{3}$ ampere. On the line side of these heat coils should be placed the regular copper blocks separated by standard dielectrics as used by telephone companies. The copper blocks should have a small hole bored in the center and this hole filled with solder so that a heavy discharge between blocks, if continued, will fuse the solder across the gap and short the circuit on the line side of the cable. If this cable is of short length, it may be connected directly to a regular switchboard without further protection. If this cable is over 1,000 ft. in length another set of heat coils and copper blocks should be used at the terminal before connecting to the switchboard, as the electrostatic capacity of the

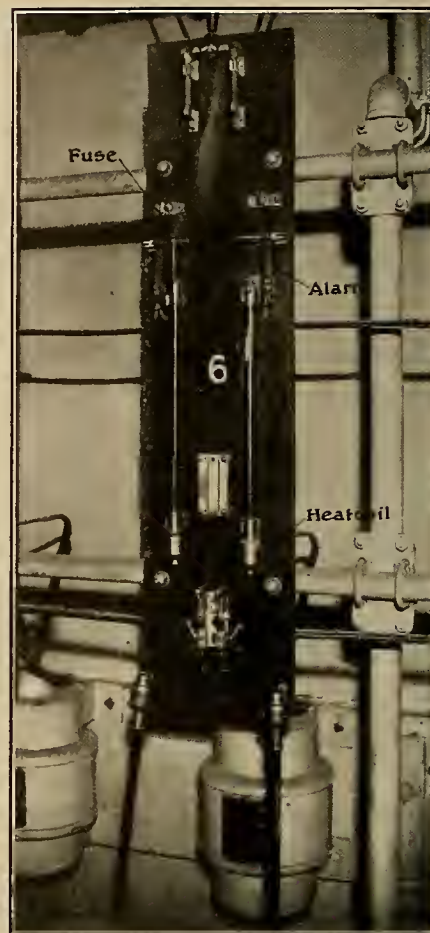


Fig. 11. Typical telephone circuit protective panel showing alarm arrangement on fuse and heat coil.

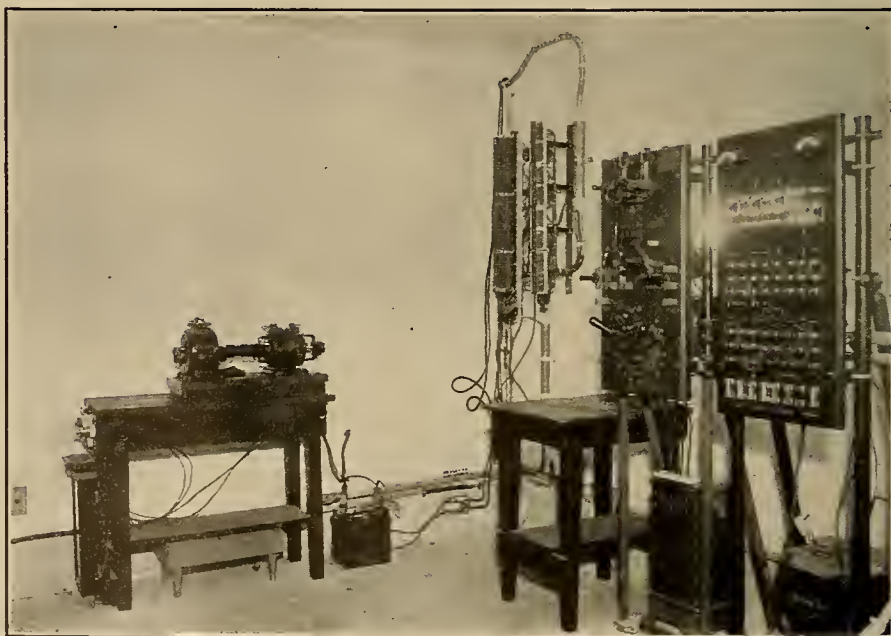


Fig. 9.—Showing motor-generator ringing set, battery-operated interrupter and pole changer, battery charging panel and battery control panel.

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Fig. 10. Main and emergency 48-volt telephone batteries.

shown by the difference in the position of the fuse holders and heat-coil springs as shown in Fig. 11.

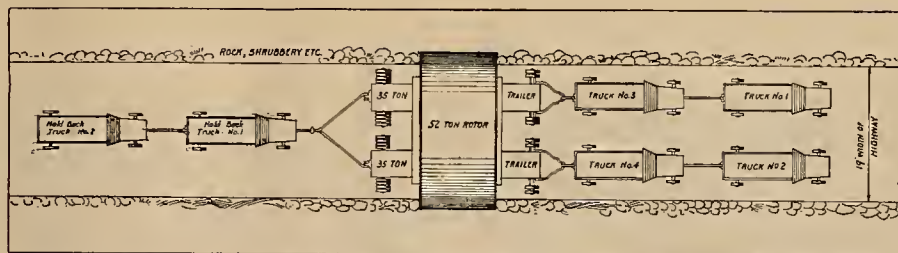
This covers the protection necessary for telephone lines of power companies when the wires are carried on the power poles and where these lines enter substations, power houses, load dispatchers's office, or the main office of the company.

Editor's Note: This is the concluding half of the first of a series of articles by Mr. Kalb in which he outlines the special features of power company telephone systems and the protective equipment involved. The second article will appear in an early issue.

Movement of 52-ton Rotor Affected by Highway Law

State highway regulations materially entered into the movement of the three main pieces of the new 40,000-kva. synchronous condenser for the Vaca-Dixon substation of the Pacific Gas and Electric Company. The two halves of the stator each weighed 40 tons while the rotor weighed 52 tons. It is obvious that special arrangements were necessary to bring this tremendous loading within the highway commission's regulations, which call for a maximum of 750 lb. per in. of rubber in contact with the road surface.

In one of the accompanying illustrations is shown a photograph of the trailer equipment when loaded with one of the stator pieces. In the other illustration is shown schematically the haul-



Sketch showing hauling arrangement necessary to transport 52-ton rotor six miles over highway.

ing arrangement necessary for the 52-ton piece. On hills it was necessary to use four 7-speed Fageol trucks pulling on the upgrade and two holding back on the downgrade.

From the sketch it may be noted that the transportation medium consists of two 35-ton trailers lashed together to form one carrying bed of sufficient size to carry the heavy pieces. Each trailer was equipped with six 8-in. dual-rubber-tired wheels, giving a total of 192 in. of rubber in contact with the highway. The overall width of this equipment as arranged was 19 ft. 6 in. The highway for the most part is 20 ft. wide.

Due to blocking the highway it was necessary to move after midnight and to take all precautions to protect the traffic and facilitate its normal movement with the least possible delays. The distance of haul was about six miles. In this distance there were a few places where detours could be provided and other places where it was necessary to collect the traffic in wide places at the roadside to await the passage of the caravan. The safe handling of traffic was accomplished by placing large signs, well illuminated by lanterns and guarded by watchmen, across the highway to direct this traffic into the wide places or into detours where such were available. As soon as a closed section of road could be traveled by the caravan, traffic was cleared in both directions and then the next section closed. A maximum speed of three miles per hour was required by the highway commission.

The wife and daughter of Colonel Berry, camp commandant, came to the gate after taps and demanded admission. The sentry objected.

"But, my dear man, you do not seem to understand," expostulated the older woman. "We are the Berrys."

"I don't care if you are the cat's whiskers," retorted the sentry. "My orders are to let no one pass at this hour."—Two Bells.

Hollow-Core Concrete Poles Are Claimed Economical

Offering at least one possible solution to the problem of the growing timber scarcity is the new Hollowspun reinforced-concrete pole. This pole is manufactured by the Westinghouse company, which claims for it longer life, increased safety factors and greater strength. It is designed for use in telephone, telegraph, trolley and transmission lines.

Concrete poles for these classes of service require a relatively high percentage of tensile and shear reinforcement. To obtain this quality the section of the individual rods is kept to a minimum and a horizontal wrapping is provided against shear failure. The resulting cage of reinforcing material is so dense that it is not possible to force the aggregate sufficiently compactly into place by ordinary methods. It is essential that the concrete mass be dense to protect the steel and to reduce the size of the pole.

In this process the reinforcing steel is calculated carefully for the particular class of pole to be made. The complete reinforcing cage is placed in a horizontal form and held in the proper place by concrete buttons which become a part of the finished pole. Aggregate then is added and the entire mass rotated at a high speed. The centrifugal force developed is sufficient to compact the concrete into a dense wall and leaves an open core running the entire length of the pole.

Removable steps for these poles may be provided for by embedding bronze inserts in the concrete at the time of forming, steps to be mounted in these inserts as desired. Provision for mounting of standard crossarms and other accessories now in use also can be applied to these poles.

It is claimed that the use of these poles makes possible an increased pole loading and thus effects an economy by reducing the necessary number of poles per mile or by increasing the number of conductors without any reduction in operating safety factor. Maintenance costs also are claimed to be at a minimum. Further, the attractive appearance of these poles might make them desirable where they occupy positions on or adjacent to prominent thoroughfares.

Optomist: "What's a ten-letter word meaning a hold-up?"
Pessimist: "I'll bite. What is it?"
Optimist: "Suspensers."

A danger sign cannot talk, but it is not half so dumb as is the fellow who disregards it.

He is well onward in the way of wisdom who can bear reproof and profit by it.



Showing 40-ton section of condenser stator loaded on parallel trailers.

IDEAS FOR THE CONTRACTOR

Electrical Estimating for the Contractor — V

Discussion of Electric Motor Drive for Woodworking Machinery and a Recent Installation

By J. R. WILSON*, Engineering Department, Los Angeles Electric Works

One of the hardest duties for electric motor drive is offered by woodworking machinery. This is due to three primary causes which appear in this class of machinery, perhaps more than in any other type of machinery driven by motors.

These causes are: multiplicity of belts, change of bearing friction due to weather conditions, and difference in fibre structure of raw material. Due to the manufacturers' desire to make each machine cover as wide a range of different designs of finished product as possible, most woodworking machines are quite complicated. In order to keep down the investment cost the majority of these machines usually are driven by a single motor. This of course necessitates a considerable number of shafts and belts in order to perform the different operations for which the machine is designed.

In a further effort to keep down the investment cost and also to reduce the floor space required by these machines, these belts are worked on very short centers. This necessitates running the belts much tighter than would ordinarily be considered good practice; this in turn imposes an extra strain on the motor.

A multiplicity of shafts of course entails a multiplicity of bearings. Due to the extra high speed at which these shafts must be driven in this type of machinery, a heavier than ordinary grade of oil generally is used on these bearings. Perhaps this would not introduce any complications under circumstances where the local temperature could be made to remain constant at all times. In most woodworking plants, due to the fire hazard, heating of the plant is given very small consideration. Therefore, the room temperature in the

fall, winter and early spring months is liable to be quite low.

This condition will be reflected very much in the difficulty experienced in starting this class of machinery during the cool months of the year. This difficulty is increased in direct ratio to the heaviness of the oil used in the machine bearings. It is surprising how much resistance can be offered by a few bearings in which the oil has congealed. The period of time during which this resistance will maintain depends directly upon the room temperature and the rate at which the shaft friction tends to warm up the oil. This extra demand will be imposed upon the motor during the time it takes the bearing oil to reach its normal operating temperature.

The third primary cause mentioned, change in fibre of raw material, is liable to occur at any instant of the machine's operation. This may appear as an extra hard grain in a certain run of lumber, or it may appear as knots and faults in only one separate piece. This of course imposes an additional strain on the motor. This added strain may remain only an instant if the hard spot is small, or may extend over a considerable period of time, as in the case of a long piece of lumber being operated upon.

Due to keen competition, most manufacturers of woodworking machinery are prone to specify a motor of sufficient horsepower capacity to handle the load only under the best of operating conditions. A motor driving one of these machines may be required to deliver 50 per cent over normal rating for a considerable period of time. A 50 deg. motor seldom will meet the requirements of woodworking drive, unless of a horsepower capacity greatly in excess of the actual demand of the normal load.

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TABLE I.

EQUIPMENT OF AMERICAN HARDWOOD COMPANY.

Motor H.P.	R.P.M.	Drive	Control	Machine
30	840	Coupling	Manual Compensator	Rees Manufacturing Co. 50-in. slow speed blower
25	1150	Belt	"	American No. 26A moulder
25	1750	Belt	"	American No. 2 rip saw
25	3510	Direct	"	{ American No. 666 surfacer
20	3487	Direct	"	
7½	870	Gears	"	Jointer
5	3450	Direct	Remote Control	American swing saw
5	1750	Direct	Remote Control	U. S. Manufacturing Co. double-end grinder
1	1750	Direct	Ex. Op. Sw.	
56½	Future			
200	Total Capacity			

Operating conditions may vary to a considerable degree between two plants making identical products. A motor drive that would be ideal for one plant might fall far short of meeting the requirements of another of the same general type. This rule of course also applies to the manufacture of any product. All these things should be taken into consideration when planning an electrical layout for a woodworking plant.

One of the pleasures a competent electrical estimator gets out of his profession is in designing an efficient plant layout which will result in the least possible expenditure of money on the part of his customer. (One of the "glooms" he gets is when he does design such a layout and some other contractor puts in an inferior installation.)

Keeping the above facts in mind it may be interesting to review the high points in a recent installation made for the American Hardwood Company. As the name implies, this plant handles hardwood, which adds another complication to those already enumerated. The owners wished to install a plant of the highest efficiency using only the latest types of machinery, best of installation materials, and motors of ample horsepower capacity.

While it was a competitive job only three contractors were allowed to pre-

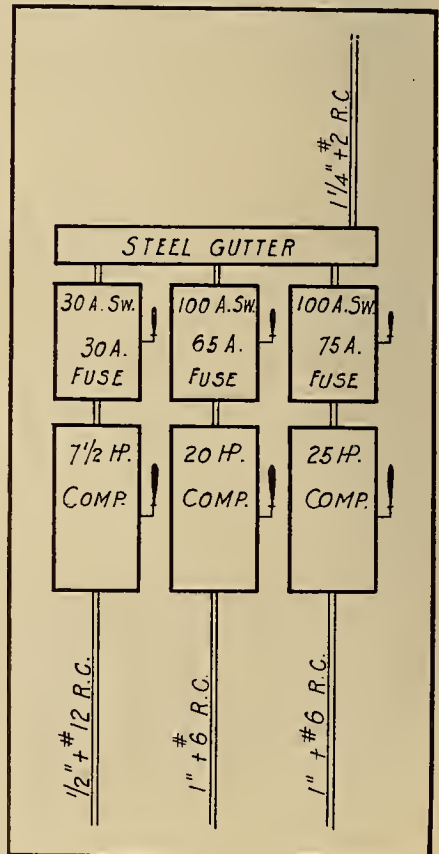


Fig. 1

pare estimates. All were known to be competent and experienced in making woodworking installations.

The general data on the job was as follows:

Present horsepower.....	143½
Ultimate horsepower.....	200
Voltage	440
Cycles	60
Building	1 story
Floor.....	6 in. concrete (in place)

Table I shows the machines to be driven, with the horsepower of each. There were four interesting features to this job:

First: The surfacer carried three motors, two of which were direct-connected to the cutting knives and one driving the feed tables through a gear



Fig. 2.—The swing saw.

train. As this machine was placed on the opposite side of the room from the balance of the equipment, it was decided to place the control all at one point, adjacent to the machine. This necessitated the only subfeeder in the installation. A plan of this subfeeder board is shown in Fig. 1.

Second: The compensators controlling the motors on both the moulders and the rip saw had to be mounted on the wall, quite a distance from where the operator would normally stand. In order to provide a method of stopping the motors in an emergency, a “normally closed” control button was placed at the operator’s station on each machine. These buttons were wired in series with the “no-voltage release” coil circuit so that pressing the button opens the circuit and instantly causes the compensator to return to the “off” position.

Third: The swing saw is one of the usual type with the motor at the lower end. This motor is controlled by a G. E. No. 7005 remote control switch mounted on the wall, adjacent to the machine. In order to provide the max-

imum in convenience of control, the start and stop button was mounted on the machine just above the motor, using flexible conduit at the top of machine in order to allow the saw to swing. This arrangement is shown in Fig. 2.

Fourth: The blower and its motor were mounted on a platform about 15 ft. above the floor level. The motor weight was 1,000 lb. and the blower weight was 1,170 lb. It was part of the electrical contractor’s job to help raise this equipment in place. This was necessary because the customer was placing the machinery with his own men. Everything except the blower equipment was placed at the floor level, and the customer could handle it with the tools he had.

The electrical contractor was supposed to have the necessary chain hoists to place the blower equipment so it was made a part of this contract. In order to provide the proper hoisting equipment, reference was made to a table which has proved its worth many times. This table is reproduced here as Table II. No credit is claimed for or-

iginating this table, but unfortunately the original author’s name has been forgotten.

Fig. 3 shows the layout for the main switchboard, and Fig. 3-A gives a general view. The switches, etc., were mounted on a wood backing as the customer had plenty of lumber on hand and did not care to pay for an angle-iron frame.

The estimated costs for this job were as follows:

Switches and fuses.....	\$216.89
Conduit and fittings.....	90.36
Wire	70.50
Sundries	5.25
Inspection	15.00
Labor	175.00
Total.....	\$573.00

It is interesting to note that the actual materials used were within 2 per cent of the estimate, and the actual labor charge was within 1½ per cent of the estimate.

TABLE II
SAFE LOADS IN TONS FOR ROPES, STEEL CABLES, WROUGHT CHAINS

Manila Rope				Steel Cables				Wrought Chains			
Dia. in Inches	One Part	Two Part	Four Part	Dia. in Inches	One Part	Two Part	Four Part	Dia. in Inches	One Part	Two Part	Four Part
½	⅓	¼	½	½	1	2	3½	¼	½	¾	1½
⅝	⅓	½	¾	⅝	1¼	3¼	6½	⅜	1	1¼	3
¾	⅓	¾	1¼	¾	2½	4½	9	½	2	3½	6
⅞	½	1	2	⅞	3¼	6	12	⅝	3	5	9
1	¾	1½	2½	1	4	8	16	¾	5	9	15
1¼	1	2	3	1¼	6	12	24	¾	6	10½	18
1½	1¼	2½	4	1½	10	19	36	1	8	14	24
1¾	2	4	6	1¾	13	25	48	1⅛	11	19	33
2	2½	5	8	2	16	32	60	1¼	13	23	39
2¼	3½	6½	11					1½	18	32	54
2½	4½	8	13								

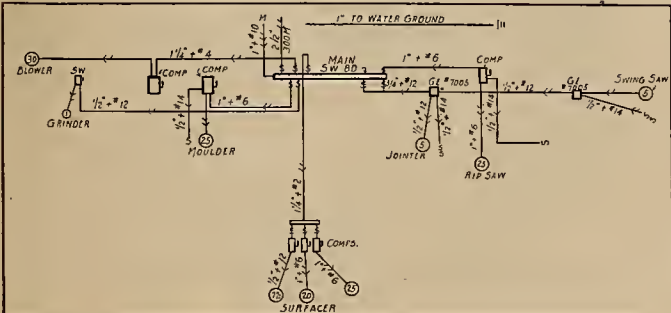
NOTE.

The above named terms, “One Part,” “Two Part,” “Four Part” are as follows:

A “One-Part” line may be any line supporting a load or attached to a load for moving same, either for direct pull or around a pulley or snatch block.

A “Two-Part” line may be any line which is run through two single sheave pulleys or blocks arranged for pulling or hoisting loads.

A “Four-Part” line may be any line which is run through two double sheave pulleys or blocks arranged for pulling or hoisting loads.



Schematic diagram of power wiring for American Hardwood Company.

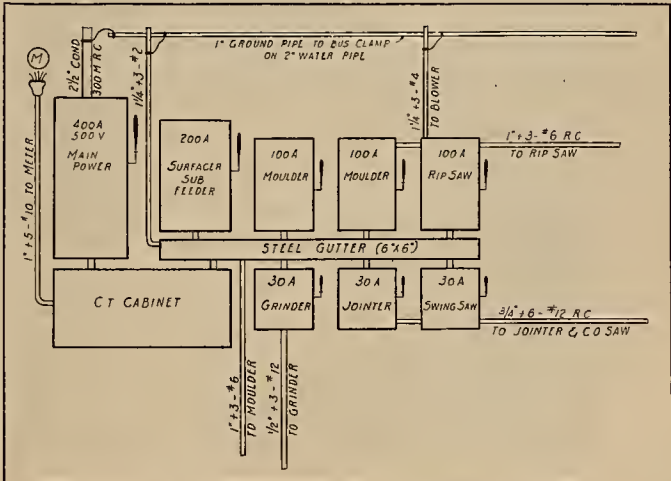


Fig. 3.—Diagram of main switchboard.

Another point that may be of interest is the method used in arriving at the estimated labor cost. The writer always uses three methods of checking the labor on a job. Each of these methods is based on data collected during a long and varied experience with "average labor costs." Each method has its advocates, and a man is naturally prone to favor the one which has proved nearest to being infallible.

The first method is the "experience" method and consists in visualizing the job in each of its component parts and placing a charge, based upon experience and judgment, against each part. The present job was treated in this manner with the following results:

Service, main board and ground	\$40.00
Surfacer and subfeeder to same	42.50
Blower	27.50
Moulder	15.00
Rip saw	22.00
Jointer	10.00
Swing saw	10.00
Grinder	8.00
Total	\$175.00

The second method of labor estimates on power installations is by the horsepower method. This method consists in computing the installation cost by multiplying the actual connected horsepower by a certain dollar factor. This factor varies with the type of building and the average horsepower of the individual motors. It is safe only when backed up by a vast amount of actual personal experience in erection and installation methods, on which actual labor costs have been kept. By this method the present job would show an



Fig. 3-A.—The main switchboard.

estimated cost of about \$1.20 per hp. This appears too low, as the writer uses an average price of \$1.70 per hp. for a job of this nature.

The third method is by the percentage method. This is percentage of material cost against labor cost. The writer's personal data show an average cost of 45 per cent of materials cost as the cost of labor on this type of job. This would give the present job a labor factor of \$172.35, which was very close to the estimate of \$175. This method must be based also upon actual personal data.

In the final analysis of any job the estimator's personal experience and judgment must be the preponderant factor.

Our next installment will deal with the power installation in a large furniture manufacturing plant which had some very interesting features and also some problems to be solved.

Co-operation Between Contractors and Inspectors

A Discussion of This Problem and an Outline of the Method of Successfully Solving It in Los Angeles

To attain the maximum of efficiency and the minimum of inconvenience to the public, all electrical contractors and inspection departments should work in the closest possible harmony. Inspection departments should consult with their local contractors when new rules are being considered, and the contractors should avail themselves of the opportunity to offer suggestions along lines of constructive legislation.

City electricians and chief inspectors should be available for consultation with the contractors during office hours. Judgment should be used of course by both sides, and the contractors should not bother "those higher up" when the decision of a deputy inspector will answer just as well. On the other hand the city electrician and chief inspector should not be bound up in so much red tape that it is impossible to consult them upon matters of real importance to the contractor.

Los Angeles has worked out this problem in what has proved to be a very logical manner. R. H. Manahan, city electrician, and H. M. Beecher, chief inspector, are available at the city hall during regular office hours to the contractor who has any problem whose importance seems to warrant their attention.

Mr. Manahan besides being city electrician, also has direct charge of the city police and fire alarm systems, all traffic signals systems, and the huge street lighting program which now is being followed in Los Angeles. With all his multitude of duties he still remains one of the most approachable and "regular" of fellows. His office is located on the main hallway of the electrical inspection department and his door is always open. He believes in the "open door" policy of running an inspection department and practices what he preaches.

On Tuesday of each week the Electrical Contractors and Dealers' Association has a lunch meeting, which all contractors try to attend, and for a most excellent reason. Mr. Manahan and Mr. Beecher always attend these lunches, and it is an open forum for all those interested in the electrical construction industry of Los Angeles.

From 12 to 12:30 is devoted to good fellowship and excellent food which is prepared on the electric range under the supervision of Helen Mikesell, the Association secretary. From 12:30 to 1:30 is devoted to a discussion of new rules pending, interpretation of rules, complaints on inspection rulings, method of construction in other cities, suggestions on new rules and similar subjects of interest.

Any contractor who feels that an inspector has done him an injustice in any way is given an opportunity to state his case. If his complaint appears justified he will receive the hearty support of the other contractors present and will always receive a fair and just decision from Mr. Manahan and Mr. Beecher.

Besides those directly engaged in the contracting end of the game representatives of the switchboard manufacturers, the power companies, the General

Electric and Westinghouse companies, and others attend these meetings.

The old saying, "If you have an idea and I have an idea, and we exchange ideas, then each of us has two ideas," is excellently illustrated by these meetings. The feeling of harmony and co-operation existing between the electrical contractors and the inspection department is wonderful for a city as large as Los Angeles. The work of the inspection department is lessened through the better understanding the contractors now have of the correct meaning of the code rules.

The individual contractor is doing a better grade of work with less resultant "corrections." This makes for quicker inspections, thereby releasing more inspectors to work on the condemning of "old fire traps," which results in more work for the contractors. A contractor never should allow anything to prevent his attendance at these meetings, such attendance being a duty to himself, his city and the calling he represents.

Any community which has an inspection department and electrical contractors doing business in it would do well to adopt the Los Angeles idea. The benefits which accrue to the general public through added safety to life and property and the benefits to the contractors as individuals are excellent reasons why such meetings should be held.

Telephone Company to Place all Wiring for Telephone Service

The Pacific Telephone & Telegraph Company recently issued a supplement, known as 1-P, to specifications E-3002, The Design of Fixtures for Telephone Service in Buildings. This supplement became effective Oct. 1, 1925, and provides that all telephone wiring in buildings must be installed by that company.

A copy of the supplement follows:

1. Necessity for Issuing Supplement. This supplement defines the position of the Telephone company in respect to the utilization of wiring provided in buildings by their owners.

2. The Telephone company is responsible for providing efficient and satisfactory telephone service and these responsibilities can be met only by the Telephone company furnishing all wire facilities used in providing telephone service.

3. Attention is called to the company's published rules and regulations under which the Telephone company is not required to connect to wires placed by others.

4. Roughed-in wires are not in accordance with the company's standards and will not be provided by the company or used by it.

5. Roughed-in wires are those which are placed in such a manner that they are not readily and individually removable when the building is completed.

6. Hereafter, therefore, where such wires are encountered the Telephone company will refuse connection thereto and will place wires when and as required for service in conformity with the company's installation standards.

Standard Method of Wire Marking
Adopted by Contractors

The Electrical Contractors and Dealers' Association of San Francisco recently devised a standard method of marking the ends of wires in installations made by their members. The question of determining the use of wires roughed-in by another journeyman has always been a problem when finishing up jobs.

By having the men mark the ends of

it is only necessary for the journeymen electricians to learn one system which is used universally by the contractors of the city.

For bell work the marking consists of knots made in the wire as given in Table 1. A similar method of marking is used for apartment telephones. This is given in Table 2.

Table 1—Bell Work

0—Knots in wire for wires from buttons to bells.

- 3—Knots—For common battery and transformer wire to all apartments.
- 4—Knots—For battery to vestibule wire.
- 5—Knots—Transformer to vestibule wire.

Contractor's Model House Opened
as Electric Home

An electrical home of unusual interest recently was opened to the public in Chico, Calif. William J. Shalz, a contractor and builder, built this model home for himself. The display was organized by LeRoy Crandall of the California Electrical Bureau and was managed by A. A. White, of the Pacific Gas and Electric Company.

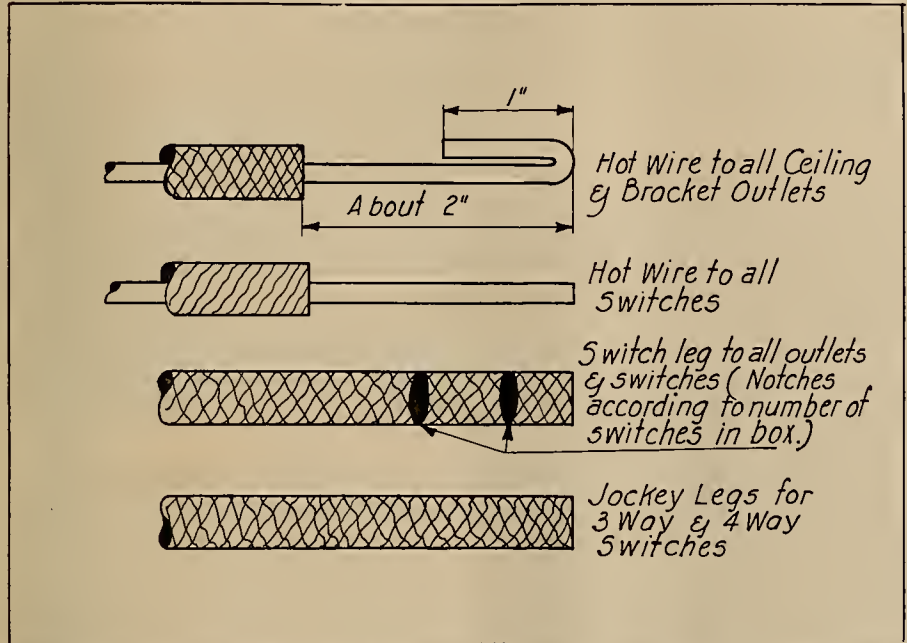
The home was equipped completely, including electric water heaters, air heaters, range, and refrigerators. During the display of the home especial emphasis was placed on electric refrigeration and the saving as compared to ice refrigeration was called to the attention of visitors.

One of the features in connection with the display of the home was a stream of colored lights from the Sycamore swimming pool to the electric home just south of the pool. The house also was floodlighted, and this attracted many people who nightly swim in this pool.

As a result of the home two prospects, who originally had planned to install electric ranges only, decided to install electric water heaters, air heaters and refrigerators in duplication of the model home exhibited.

A leaflet which contained a picture of the home, details of the display dates, and names of the electric dealers and others who supported the home was mailed to every lighting consumer of the Pacific Gas and Electric Company in the Chico territory. It also contained a little synopsis of what the modern electrical home should be.

The electrical wiring and equipment was provided by the electrical industry of Chico, including Conery & White, Bird Electric Company, Chico Electric Company, Boblet Manufacturing Company and Fisher Electric Company.



Standard method of marking wires that identifies the use for which they have been installed.

the wires as shown in the accompanying diagram there is no question about the use for which they were installed. In this way a great deal of time is saved in tracing out the different wires and circuits. Even though the same man who roughed-in the work may install the finish, it is almost impossible to remember the use of the wires without some marking.

By establishing a standard marking

- 1—Knots in wire for battery wires to buttons.
- 2—Knots in wire for battery wires to bells.

Table 2—Apartment Telephones

- 0—Knots—For individual ringing wires from vestibule to each apartment.
- 1—Knots—For common talking wires from vestibule to all apartments.
- 2—Knots—For common door opener wire from door to all apartments.



This model electric home was built by a Chico contractor and builder for his own use. It was opened to the public before being occupied.

BETTER MERCHANDISING

Homey Touch Effective in Pomona Establishment

Fixture and Appliance Display and Arrangement, Tasteful Decoration, Give Store Unique Distinctiveness

Fixture and appliance displays are like anything else. There are fixture displays—and then there are fixture displays. The thing which singles out one such display from all others is the quality of originality with which it is prepared. In this respect the store of C. W. Jones, the Pomona Fixture & Wiring Company, of Pomona, Calif., is unique.

Characterized by a thoughtfully planned use of floor space, a separation of the working and stock departments from the display rooms by distinct lines, and tasteful arrangement of display rooms and show cases, the Pomona establishment has set a high standard for stores of this character.

Each section of the store, from the front windows, through the display rooms, even to the shop itself, has distinctive features. The front display windows are made extremely flexible of arrangement because of the fact that the floor is removable, set up on special horses. The main floor underneath is finished, so that displays may be set upon it if occasion requires. The backs of the store windows are also removable. Other sections of back for the windows have been made so that they may be used alternately or in combination with the original backs. Glass or

wood panels may be used at the option of the window dresser.

Outside the front entrance a weather-proof outlet has been installed for use in demonstrating washing machines or refrigerators out of doors. Two outlets also are provided, one on each side, for the requirements of special displays at the sidewalk.

Four circuits have been run to each window, making possible many color effects. By means of a flasher these may be varied automatically at night.

Inside the store, instead of the usual counters ranged alongside the walls of the store with the stock on shelves behind them, the counter has been made in the form of a rectangular, full-display, plate-glass show case, in which the appliances are displayed on glass shelves. The show cases themselves are illuminated so as to bring out every feature of the merchandise displayed. Outlets have been provided to demonstrate appliances conveniently.

Along the walls special display cases for appliances have been built, lighted from within, and having glass shelves upon which the merchandise rests. A small shelf in front of each wall case enables the sales clerk to take the appliance down, place it upon the shelf,

and demonstrate its good qualities to the customer. Outlets have been provided in the jogs of the wall cases for easy access to any appliances thus displayed. The stock cases, below the wall display cases, are provided with sliding wooden panels, and the stock itself is set upon glass shelves inside them. Each table lamp has an individual compartment.

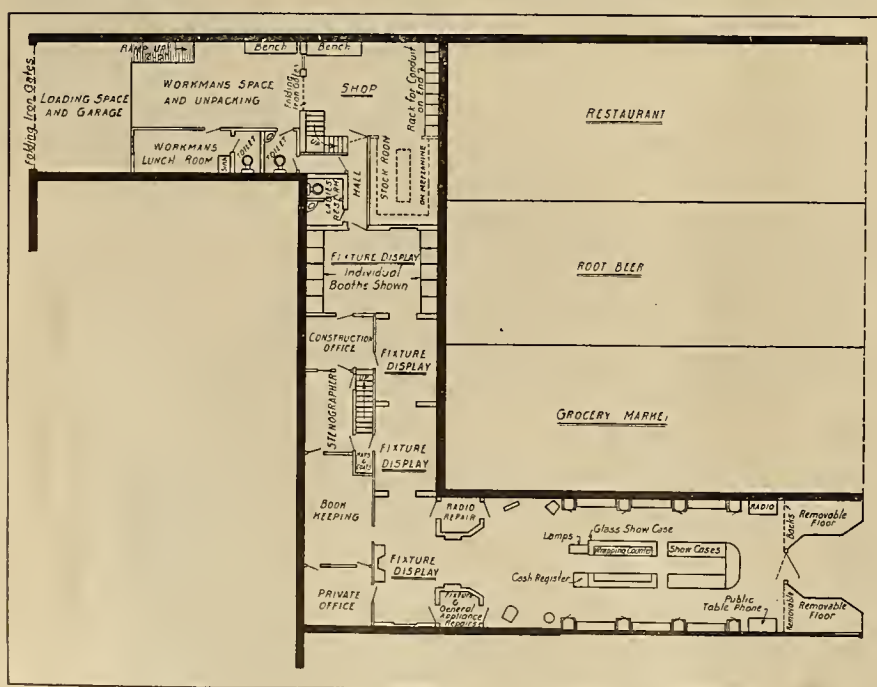
Illuminated glass signs above the wall cases tell of the appliances the store has for sale, such as vacuum cleaners, Mazda lamps, electric heaters, radio equipment, washing machines, as well as wiring supplies, table appliances, everything electrical. A circuit placed above the cases provides for the lighting of the walls from concealed floodlights.

Leading into the fixture display rooms and offices is another illuminated glass sign, placed beneath an archway beautifully decorated and surmounted by a grillework. The fixture rooms are thus cut off from the front part of the store, occupying a space as shown in the ground floor plan accompanying this article.

For the more individual display of electric fixtures, special appointments have been provided to make this section of the store of distinctive nature. Instead of one room, into which would be crowded several fixtures, none of which would have sufficient space for proper display, Mr. Jones has arranged to provide several display rooms, limiting the number of fixtures in each to a minimum. Better display of each thus is provided.

The first display room, opening off the main store, is larger than the others. Hominess has been made the keynote of these display rooms, good furniture, well arranged, being provided to give this effect. The fixtures used are hung at intervals from the ceiling, some wall brackets also being used. For the display of table lamps and group brackets, separate booths have been provided. Outlet plates and tumbler switch plates have been made easily accessible and yet have been decorated with the same coloring used on the walls.

In the several smaller rooms for the display of fixtures, chairs, davenport, mirrors and homelike furnishings have been provided. The carpets on the floor are restful, and smoking stands are provided near the chairs for the comfort of men who come to see about fixtures for their homes. There are radio outlets in every room, and many electric heaters in small artificial fireplace mantels. Every fixture on display can be lighted up, three having been arranged on each switch, staggered so that they may be segregated. One room has a lower ceiling so that the fixtures may be examined more closely. The walls have an oil finish which makes them easily cleanable.



Sketch of the floor plan of the Pomona Fixture & Wiring Company's store, showing the arrangement of the main store, fixture rooms, offices and the separation of the shops into a wing of their own



UNIQUE in many respects is the Pomona Fixture & Wiring Company's store. 1. The main merchandising section of the store, with the wall display cases, and special show-case counter in the center. 2. The main fixture display room, with individual booths for table lamps. 3. A series of individually appointed display rooms, each arranged with a homelike atmosphere, provided with radio and all the comforts of home. Fixtures are given more effective display here.



NEWS OF THE INDUSTRY

Southern California Edison 1926 Budget to Be \$32,558,000

Increasing its annual budget for construction, extensions and betterment, \$7,000,000 over that of last year, the budget of the Southern California Edison Company, Los Angeles, for 1926 will be the largest in the history of the company, amounting to \$32,558,000.

The principal items in the tentative budget are: \$10,958,000 for additional water power development on the Big Creek-San Joaquin project and a new transmission line; \$8,000,000 for the completion of the new 70,000-hp. addition to the steam plant being constructed at Long Beach with provision for additional units in the future, and \$13,600,000 for additions to substations and extensions to distributing lines to serve new customers.

Included in the item of \$10,958,000 for additions to water-power development will be the cost of completing the Florence Lake reservoir to a total capacity of 60,000 acre-ft., the construction of a tunnel 13 ft. in diameter and 6½ miles long between Huntington Lake and the new Shaver Lake reservoir, and the first year's work on the Shaver reservoir itself, which will ultimately have a capacity of 138,536 acre-ft. and will be the largest on the company's system. Money is included also for beginning the construction work of the 115,000-hp. generating station located on Big Creek. Construction work on the 225-mile 220-kv. power transmission line to convey the water power so generated from Big Creek to southern California will be carried on actively during 1926.

Increasing the capacity of the Long Beach steam plant to 260,000 hp., the new 70,000-hp. addition will be the largest steam turbine as yet installed west of the Mississippi River. Over seventy-five substations either will be built or will have their capacities materially increased during the coming year. The lines serving these substations and distributing the power from them are included as items in the \$13,600,000 for additions and miscellaneous betterments.

Bill Would Permit Cities to Sell Power Outside Limits

Enactment of a law to permit cities owning or operating their own electric plants to sell power outside their corporate limits will be requested of the Washington state legislature when it convenes in special session Nov. 9. The bill has been drafted after conferences between representatives of Tacoma and Seattle and cities in western Washington desirous of obtaining power from the municipal plants of the two larger cities.

The bill provides that a city may sell any surplus energy to any other municipal corporation or governmental

agency which owns or operates its own distribution system and which is situated within 75 miles of the corporate limits of the city owning the generating plant, or within 25 miles of its transmission lines. It provides also that sales may be made to any person, firm or corporation within 10 miles of the city generating the power, or within three miles of its transmission lines. These restrictions, according to backers of the bill, would prevent cities from going into the wholesale power business such as the Bone bill would have permitted.

Unlike the Bone referendum measure defeated at the general election in Washington in 1924, which made no provisions for a tax on sales outside the cities, the proposed bill provides for a 5 per cent tax on all such sales. This tax is to go to the state.

Fixing of the rates on power sold outside will be kept from control of the state department of public works by giving such power to the cities. It is provided, however, that such rates shall not be in excess of 15 per cent, inclusive of the state tax, more than the rate charged in the city. Outside users are safeguarded, those sponsoring the bill contend, by a provision to the effect that the city cannot discontinue the sale outside because of a demand within the city, nor for any other cause except as provided for in the rules governing consumers within the city.

The bill would permit cities having power to sell to build betterments to its plants, extend transmission lines and distribution systems to the point of consumption, but would prohibit them from acquiring or maintaining a distribution system in any other city or town. This would make it necessary, it is pointed out, for other municipal corporations buying energy to distribute their own energy after it has been purchased from a city generating it.

Five per cent of the gross receipts for sale of energy outside the city limits shall be remitted to the state treasurer every month and shall be deposited by him to the credit of the state general fund, the bill provides.

The proposed bill, its backers declare, will be introduced early in the session, and prompt action on it will be urged by sponsors of the measure.

Pit No. 4 License Sought.—The Mt. Shasta Power Corporation pursuant to its preliminary permit of May 5, 1923, has applied for license covering Pit No. 4 site on Pit River, near Redding, Calif. The power is to be sold to the Pacific Gas and Electric Company. The development will make available 56,880 hp. of primary power. It is proposed to install three 40,000-hp. generators.

Evaluate Utilities' Distribution Systems in San Francisco

At hearings held in San Francisco in connection with the proposed acquisition by that city of a system for the distribution of Hetch Hetchy power, engineers of the California Railroad Commission placed a tentative valuation of \$10,439,990 on the physical properties of the Great Western Power Company within the city limits, and \$24,914,510 on those of the Pacific Gas and Electric Company. The figures set by the latter company on its properties was \$55,000,000.

The valuation figures included lands, power plants, poles, towers, fixtures, meters and street lighting equipment. Items such as severance damages, good will, additions and improvements made since Feb. 11, 1924, were not included. The physical properties of the Universal Electric Company, a small company owned jointly by the Great Western company and the Pacific Gas and Electric Company, were included in the valuation of the former company's properties, and when final figures are presented the valuation of the Universal company's property will be divided with the Pacific Gas and Electric Company.

The hearing of the Great Western Power Company was continued until Dec. 4, as its final figures will not be ready until then, and that of the Pacific Gas and Electric Company to Jan. 12.

Attorneys for the Pacific Gas and Electric Company objected to the hearing on the ground that the Railroad Commission had no authority to enter into valuation proceedings until a condemnation suit had been started, but the objection was overruled by the commission.

New Optional Rate Schedule Put into Effect in Olympia

New optional lighting rates designed to counteract a rate schedule put into effect in Olympia Sept. 1 by the Puget Sound Power & Light Company, and which, according to company officials, will tend to reduce bills of larger consumers in residential districts, were filed with the state department of public works, as a result of a conference held Oct. 5 between officials of the department of public works and company officials.

The conference followed petitions filed previously by more than 75 electricity consumers of Olympia protesting that the company's new rate schedule discriminated against the residential consumer in favor of the large commercial consumer. The new optional rate agreed upon has a service charge of \$1.25 a month plus a consumption charge of three cents per kw-hr. a month.

Stave Falls Plant of B. C. Electric Railway Company Opened by Premier Oliver

The Honorable John Oliver, premier of British Columbia, declared open the completed Stave Falls plant of the British Columbia Electric Railway Company, 42 miles from Vancouver, on Sept. 19, in the midst of a party of 150 public representatives from Vancouver and surrounding districts.

At 12:30 noon Mr. Oliver turned a gold key which set in motion the motors on the governor of the fifth and final unit, thus admitting water at an accelerating speed into the turbine. He received the key a moment before from George Kidd, president of the company, and later was presented with it as a memento of the occasion.

The work, of which this is the culmination, has extended over the last four years. (Journal of Electricity, Aug. 15, 1925, p. 147.) When the Stave Falls plant was taken over from the Western Power Company of Canada in 1920 the British Columbia Electric Railway Company immediately installed a fourth unit of 8,825 kva., bringing the total installation up to 35,300 kva.

In April, 1922, work was begun on the raising of the level of Stave Lake 22 ft. by building the Blind Slough dam and raising the main and intake dams. This work was completed in 18 months. The water storage thus was trebled, and in addition it was decided to proceed with the Alouette development whereby Alouette Lake water is diverted through a tunnel into Stave Lake.

The additional storage and Alouette water made possible a fifth unit of 13,125 kva., and the higher head of water allowed the four original generators to be rewound for the same capacity. The new plant therefore has a capacity of 65,625 kva.

Included in the new work was the building of an outdoor switching station over the tailrace of the plant. In this station provision is made for receiving current from the Alouette plant which will be ready in the fall of 1926. The Alouette plant will be an automatic plant of 10,000 kva. in a single unit. It will be operated entirely from Stave Falls, the turbine being set in motion by throwing in the main power switch.

All this work was inspected by the party on Sept. 19. For the entertainment of the guests the stop logs were removed from one of the bays in the Blind Slough dam so that they might see the force of water stored in Stave Lake. Following that, water was admitted into the penstock of the fifth unit and then the party descended into the power house where the premier made his way to the switchboard gallery and turned the key.

San Francisco Man is Second in Curtis Lighting Contest

In a recent contest instituted by Curtis Lighting, Inc., Chicago, in which suggestions were asked for the best definition of Curtis Lighting, the second prize of \$20 was won by Fred A. Gross of San Francisco.

Mr. Gross, who is director of window displays for the Owl Drug Company of that city, with headquarters at 22nd and Mission Streets, submitted the definition: "...changes gloom to glow—and dusk to dawn."

The competition was conducted in all parts of the United States. The first prize, \$50, was won by M. A. Godwin, Campello, Mass., who defined Curtis Lighting as "daylight continued."

New 220-kv. Substation for the San Joaquin Valley

Construction is about to be started on the new Wilson substation of the Great Western Power Company of California. This station is to be located adjacent to the Santa Fe railroad about two miles east of Merced, Calif. To serve as a southern terminus of the new 220-kv. tie-line between the systems of that company and the San Joaquin Light & Power Corporation, the station will be an important transmission control point.

The building will be of structural steel and concrete and of sufficient size to house an initial installation of two 25,000-kva. synchronous condensers. Plans and arrangements contemplate the later addition of accommodation for two more condensers, and, of course, the usual control, metering and low-tension switching equipment. The station is so located and arranged that spur track facilities are available and equipment and material may be unloaded from cars by the station crane.

All high-tension bus and switching equipment is to be placed outdoors. The initial installation will provide for two 75,000-kva. transformer banks and space for six 120-kv. outgoing lines, two of which will go in as soon as the bus structure is completed. All of the major electrical equipment is to be supplied by the General Electric Company.

A 220-kv. transmission line will connect the new substation with the present Great Western system at Brighton substation near Sacramento. The length of line will be nearly 104 miles. Twin-circuit 100-ft. steel towers supplied by the Pacific Coast Steel Company now are being erected as fast as three competing crews can erect them. The average span is to be 830 ft. Spacing between conductors will be 16 ft., vertically, and between lines 27 ft., horizontally. Only one line is to be strung as an initial installation. This line is to be of 1.1-in., steel-core, aluminum cable and will be supplied by the Aluminum Company of America. The standard suspension strings will be composed of fourteen 10-in. Locke units and dead-end and transposition strings are to be made up of sixteen Locke high-strength units. Static shields are to be placed between the conductor and the first insulator unit.

Initial operation of the tie-line will be at 165 kv., to be followed later by full 220 kv. The possibility of the future need for 60-kv. and 11-kv. lines at the new substation also is contemplated in the layout plans. A carrier-current telephone is to be installed to provide sure communication between the Great Western dispatching center in Oakland, the new substation and the San Joaquin dispatching office in Fresno.

At the present time 50 per cent of the tower-footing holes have been dug, about 30 per cent of the footings set and some three miles of towers completely erected. June 1, 1926, is the date set for the expected completion of both the substation and three transmission lines. Tower material is being transported to the right-of-way at the rate of about twelve towers per day in an effort to deliver all of the heavy material before weather conditions seriously interfere with transportation over the temporary roads.



Outside the Stave Falls power plant at the official opening of the fifth unit. Officials of the B. C. Electric Railway Company at the opening ceremony with the Honorable John Oliver, Premier of British Columbia. Reading from left to right: J. I. Newell, electrical superintendent; R. M. Skinner, superintendent of construction at Stave Falls; George Kidd, president, B. C. Electric Railway Company; Honorable John Oliver, Premier of British Columbia; T. G. Murrin, vice-president, B. C. Electric Railway Company.

Girand Application for Colorado River Rights Taken Under Advisement

Washington Correspondence.

After two days of further hearings on the application of James B. Girand for rights on the Colorado River at Diamond Creek, the Federal Power Commission took the case under advisement. An immediate decision is not expected.

Such uniform opposition to the granting of the Girand license came from all of the states in the Colorado River basin that it is recognized that an unusual amount of political courage would be required to order the license issued. On the other hand the attorneys for Mr. Girand contended that their client had complied exactly with the water-power act. Under these conditions, they argued, a license may not be withheld legally.

On the eve of the hearing the United States Geological Survey issued a report by E. C. LaRue, one of its engineers, recommending a dam which would flood out the proposed dam at Diamond Creek. Before the hearing was ended the State of Arizona formally filed an application for federal rights covering such a project.

The representatives of Mr. Girand contended that the rights of all the states could be protected by including conditions in the license. It was argued that any protection granted by the Colorado River compact thus would be made to apply to his development. L. Ward Bannister, representing Colorado, declared that any such waivers could not bind the commission or the applicant and that they left the third parties to the agreement without recourse in law. He urged that no action be taken until the compact has been ratified by all of the states. He predicted that Arizona would ratify it at the next session of its legislature.

The representative of Governor Hunt of Arizona, opposed any private development on the river in Arizona on the ground that the state is preparing to undertake it. The attorney-general of Arizona contended that Mr. Girand had forfeited his state rights. This Mr. Girand denies. It is his position that he began work on the project within the limits of his state permit, but was stopped by a federal injunction issued at the request of the Federal Power Commission.

George L. Maxwell opposed the Girand license on the ground that it will interfere with the high-line gravity canal intended to furnish water for irrigation purposes.

The contention on behalf of California among other things was that the Girand development would "skim the cream" from the power market and thereby delay the construction of the Boulder Canyon dam for an indefinite period.

Representatives of the Imperial Valley argued that the development at Diamond Creek would increase the low-water flow of the river and give Mexico a claim on a larger amount of water.

Governor Nellie T. Ross, of Wyoming, was firm in her insistence that no rights be granted until the compact is signed. Wyoming is high now, she said, and can take no chances on

being high and dry, too. Frank Mondell, former representative, contended that Congress in authorizing the Colorado River Commission had taken the Colorado River out of the hands of the Federal Power Commission. He argued that the Commission has no authority to act until the compact is accepted or rejected.

Long Beach Steam Plant Addition to Start Immediately

Work is to begin immediately on the installation of a 50,000-kw. unit at the Long Beach steam plant of the Southern California Edison Company, Long Beach, Calif. This new installation will conform in general style and plan to the two 35,000-kw. units which make up Long Beach steam plant No. 2, built in record time last year.

An addition to the present structure housing Long Beach steam plant No. 2 is to be built in which to install the new unit. Seven Stirling type Connolly boilers built to operate at 375 lb. pressure and at a temperature of 725 deg. F., are to be installed to operate the unit. Westinghouse condensers are specified. Combination burners capable of burning either natural gas or fuel oil are to be installed to care for the new unit. Additional switch galleries for General Electric oil switches are to be built. A General Electric turbo-generator rated at 50,000 kw., 50 cycle, 3 phase, 11,000 volts, is to be installed.

Estimated cost of the new work has been placed at approximately \$6,000,000, and completion date has been set tentatively as July, 1926. Stone & Webster, Inc., who designed and built Long Beach steam plant No. 2, have been engaged to lay out and construct the new station.

New Idaho Falls Office Opened by Utah Power Company

A new store and offices have just been opened by the Utah Power & Light Company in Idaho Falls, Idaho, in the Earl Building south of the post-office. One of the features of the new store is a parcel-checking department, where shoppers in Idaho Falls, many of whom come from near-by smaller communities, may deposit their parcels while engaged elsewhere. Another convenience which has been installed is a completely equipped ladies' rest room.

The new display room for electrical appliances has been attractively arranged, and the entire quarters are said to present a splendid example of up-to-date ideas and efficiency in lighting.

Large Hydroelectric Project Planned in Japan.—Plans are being made by the Mitsubishi interests of Japan for a large hydroelectric project at Chosen through the utilization of the Choshinko River. The energy developed, estimated at 347,000 kw., will be used for various electro-chemical purposes as well as for power and light. The total capital requirements are estimated at 200,000,000 yen (\$100,000,000).

Recommends 20,000-kw. Increase to Pasadena Plant

Recommendation that authorization be given immediately for the drawing up of plans and specifications for a new 20,000-kw. unit for the municipal electric power plant at Pasadena, Calif., has been made by B. F. DeLanty, acting general manager. The recommendation was made in the eighteenth annual report of the Municipal Light and Power Department recently filed with the city directors by Mr. DeLanty. It was based on the fact that the maximum demand during the year was 11,061 kw. and that the present plant has a maximum capacity of 12,500 kw. and the small reserve plant a capacity of 6,222 kw. only. The 20,000-kw. unit would make necessary the purchase of four 1,000-hp. watertube boilers. It was recommended further that the new plant be so constructed as to use 350-lb. steam pressure instead of 250-lb. pressure as used in the present plant.

According to the report, sales of electrical energy for the year ending June 30, 1925, amounted to \$1,306,075.20, an increase of 27.35 per cent over those for 1923-24, which amounted to \$1,025,521.95. Undepreciated capital assets as of June 30, 1925, were given as \$3,760,268.24.

The gross income for the period was \$1,569,809.80. After deducting operating expenses, depreciation and other expenses, there remained a surplus of \$376,355.55 for the year, an increase of \$79,132.61 over the previous year.

Mr. DeLanty pointed out that in order to compare the results of the year's operation with the results of private corporations of the same character in California it is necessary to deduct taxes which would have been paid if the city plant was that of a private company. The amount which would have been paid as taxes would have been \$142,798.08 which, deducted from the surplus, leaves a balance of \$233,557.76 for the year.

British Columbia Sends Power to Washington in Shortage

For the first time power was transmitted across the British Columbia-Washington boundary under emergency conditions when connection was made recently between the lines of the Puget Sound Power & Light Company and the British Columbia Electric Railway Company, Ltd. A total of 13,000 kw. was sent south over the interconnected lines from power generated at Stave Falls, B. C. The lack of rain in the Pacific Northwest this fall has created a decided shortage of electric power throughout Washington.

Unprecedented low water in the rivers of western Washington has caused a serious shortage in the city of Tacoma, the municipal light department states. The city is buying power from Seattle over the intertie line, receiving about 100,000 kw-hr. of current daily. Seattle is forced to operate its steam plants in order to supply the current for Tacoma. Tacoma also is buying from several local manufacturing plants and is operating its steam plant to capacity.

Ten-Year License Issued for Alaska Power Project.—A license for ten years has been issued the Buchen and Heinen Packing Company covering a project on Lower Lake on Baronof Island, Alaska.



New power house of the Hawaiian Electric Company (left), the capacity of which has been increased by 12,500 kva., and (right) the new turbo-generator and auxiliaries.

Hawaiian Company Installs New 12,500-kw. Steam Unit

Increasing the capacity of the Hawaiian Electric Company's new power house from 25,000 kw. to 37,500 kw., a third steam-driven generating unit was completed early this last summer. The steam end of the addition includes two 825-hp. Stirling water-tube boilers, a Green economizer, a Cochran metering feed-water heater and a second reinforced-concrete stack 213 ft. high. The boilers are guaranteed for 200 per cent or normal rating. Each has 8,240 sq.ft. of heating surface. This installation brings the total of these boilers in service at this station to eight. Foundations are in for the addition of two more whenever they become necessary.

The turbine is a Westinghouse, single-flow, 12-stage unit designed for steam at 300 lb. gage and 200 deg. superheat. With the exception of the circulator all of the auxiliaries are arranged with both steam and electric drive. The circulator has only electric motor drive. A Westinghouse condenser of 20,000 sq.ft. cooling surface and equipped with two occluders operates at a vacuum of 27.75 in. at full load. Intake water averages 80 deg.

The generator is rated at 12,500 kva. at 0.8 power factor, 11 kv., 60 cycles, 1,800 r.p.m. On average daily plant operation with an average 24-hour load of 9,000 kw., this new unit has generated as high as 303 kw-hr. net per bbl. of fuel oil. A closed, circulating-type air cooler soon is to be installed to prevent the accumulation of dirt and moisture in the windings of the generator. The generator and switchboard also are Westinghouse.

An increase of 4,000 kw. since 1919 now brings the peak load imposed upon the plant to 15,000 kw. This load includes the lighting and industrial load of Honolulu as well as the plantation pumping load of the island of Oahu. The pumping load of the sugar plantations varies but little over the 24-hour period, and this enables the plant to operate at a high degree of efficiency.

California Wire & Cable Company Buys Plant in Oakland

As a result of the sale of its plant in Oakland to the California Wire & Cable Company, Orange, Calif., the Illinois Wire & Cable Company will retire from the field of wire manufacturing in California.

With factories at Orange and Oakland, Calif., the California Wire & Cable Company feels that it will be in position to render excellent service to

purchasers of weatherproof wire on the Pacific Coast. Its Los Angeles office at 1319 Bartlett Building will be continued, with Emmett H. Jones in charge as factory representative. An interesting feature in connection with the business is that the product is essentially Western, the bare wire being purchased from the mills of the Columbia Steel Company at Pittsburg, Calif., which derives the raw product from mines in Montana.

In future all sales of the California Wire & Cable Company's products will be handled exclusively by the Pacific States Electric Company at all of its branches.

Escondido, Calif., to Have Street-Lighting System

Escondido, an agricultural and vineyard city of 2,500 in San Diego County, is to inaugurate its "White Way" within the next ninety days.

Bids were received on Oct. 13, for fifty-three ornamental lighting standards, 16-ft. to light centers, No. 1175 Union metal, with GE Form 12 units, 118 glass. The Globe Electric Company of San Diego was low bidder with a bid of \$13,340, the contract being awarded on Oct. 14. These standards will be placed on Grand Avenue from Nutmeg to Juniper; Lime Street from Indiana to Florida; and Kalmia Street from Indiana to Grand Avenue.

This will give Escondido a modern ornamental street-lighting system which, it is felt, may lead to further street lighting in that city.

Hydroelectric Plant to Be Built on Little Spokane River, Wash.—Announcement has been made by Mark F. Mendenhall, president, Mount Spokane Power Company, Deer Park, Wash., that that company will start construction of a new hydroelectric plant early next year. The plant, which will be erected on the Little Spokane River about 35 miles northeast of Spokane, will develop 1,000 hp. and will cost approximately \$45,000. The project will be financed principally through local stock sales.

Increase of \$2,173,836 in Utility Valuation for Washington.—Assessed valuation of all personal property in the state of Washington belonging to electric light, power, water, gas, telephone, express and other kindred public service companies, for the year 1925 totaled \$24,481,510. This is an increase of \$2,173,836 over the assessed valuation for the same companies in 1924, which totaled \$22,307,674, according to figures just compiled by the state tax commission.

Los Angeles Starts Work on Nine Substations

Work on nine of the twelve new substations to be built for the Los Angeles Bureau of Power and Light began recently. The largest of the group to be built at this time is to be located at Ninth and Mateo Streets. It will have an installed capacity of 65,000 hp. and will replace the two smaller substations now being operated to capacity in that district. The building is to be of reinforced concrete throughout and will cost approximately \$400,000.

Other substations to cost \$75,000 each will be of steel frame construction. These are to be located at Longwood Avenue and San Vicente Boulevard; Missouri Avenue and One Hundred and Second Street, Sawtelle; Menlo Avenue and Ninety-first Street; Sixth Street and Eleventh Avenue; Clinton and Hoover Streets; one in Lankershim, one in Reseda, and one in Owensmouth.

Suit Threatened in Seattle Joint Pole Disagreement

The Seattle municipal light department and J. D. Ross, superintendent of lighting, are threatened with court action, due to the entanglements of a contract with the Puget Sound Power & Light Company for the use of street poles. For years there has existed between the department and the power company an agreement that wherever either puts up a new pole the other shall bear the cost of transferring its wires onto it from the old pole, the object being to avoid duplicating pole lines.

The agreement was satisfactory to both parties until a few months ago when the power company started an expansion program in various parts of the city, with the result that Mr. Ross complained that he had neither the men nor the funds to keep up the transferring of city lines. Finally he ordered work stopped, and the power company has complained to Clark R. Jackson, superintendent of public utilities.

Mr. Ross declares that the city was the first to enter many of the outlying districts, "and now that they are built, the company comes along and puts up its poles." The matter has been referred to the judiciary committee of the city council to investigate.

Westinghouse Combines Phoenix and El Paso Offices

The offices of the Westinghouse Electric & Manufacturing Company at El Paso, Texas, and Phoenix, Ariz., have been consolidated under the direction of E. D. Stewart as branch manager of the El Paso office. W. G. Wilson has been appointed local manager at Phoenix.

J. H. Knost, formerly branch manager of the Phoenix office, has been appointed industrial and power sales engineer for the entire Los Angeles district and will be located in the Los Angeles office. R. A. Hopkins, who has been manager of the engineering division, has been appointed central station division manager. J. C. Jones has been appointed assistant manager of the central station division, and will be responsible for the sale of supply apparatus throughout the Los Angeles district.

A.G. Manufacturing Company Has New Home in South Seattle

The new plant of the A. G. Manufacturing Company is in full swing at 303 West Hudson Street, Seattle. Compared to the inadequate and inconvenient quarters previously occupied by the company in the northern part of the city, the new factory building in South Seattle stands out in marked contrast. Transportation and general shipping facilities are better, factory lighting much improved, and the handling of materials during manufacture greatly facilitated. The company produces safety switches of various kinds and "dead front" industrial switchboards, and reference to the accompanying photographs will show that



New South Seattle plant of the A. G. Manufacturing Company.

they think well enough of their own "medicine" to take it themselves. Coincident with the factory expansion comes the appointment of the George A. Gray Company, 910 Howard Street, San Francisco, as California sales representatives.

As to the factory itself, one of the outstanding features is the total absence of the usual motley array of overhead belting in the machine shop. All motors for driving machines—and each machine has its own individual drive—are mounted directly on the machines. Silent chains suitably enclosed in specially designed guards form the mechanical connection between motor and machine. The general interior view of the machine shop shown in the illustration gives an idea of the mechanical arrangements mentioned. It may be noted that each machine motor is controlled by an A-G foot-operated safety switch. Thus for the frequent startings and stoppings of the machines the operator is not required to remove his hands or eyes from the work in hand. The only exception to this is the big press which is controlled by an

A-G hand-operated safety switch. The shop is so laid out that raw materials are received at one end and progress through the various stages of manufacture without re-routing and re-handling.

Grays Harbor Utility Property Valuation Hearing Held

Hearing on the valuation of holdings of the Grays Harbor Railway & Light Company of Aberdeen, Wash., recently was held before the state board of equalization at Olympia.

By stipulation between J. E. Calder, Grays Harbor County assessor, and the State Tax Commission, the tax commission assessed the company's entire electrical system as well as its street railway property, placing the combined valuation of both at \$1,591,937. At the hearing the company contended that this valuation should be reduced to \$1,174,372, which it argued was a fairer valuation. Of this valuation, the company apportioned \$233,221 to the street railway system and \$941,151 to the light and power system.

Herbert J. Flagg, former chief engineer for the state department of public works and now chief engineer for the Grays Harbor Railway & Light Company, was chief witness for the company at the hearing.

Applies to Commission for Stock Sale Permission

Application has been made by the Southern California Edison Company, Los Angeles, to the California Railroad Commission for permission to sell 100,000 shares of series B 6 per cent preferred stock, face value \$10,000,000.

The proceeds of this issue, if authorized, will be used to reimburse the company treasury for capital expenditures heretofore made and to finance the construction, completion and extension of its properties.

Will Re-advertise for Bids.—The Bureau of Reclamation will re-advertise for bids for the construction of the power plant at Yuma. The original bids were in excess of the appropriation available. Sufficient changes have been made in the specifications to bring the work within the limits of the money available, it is believed. The opening of the new bids probably will take place early in December.

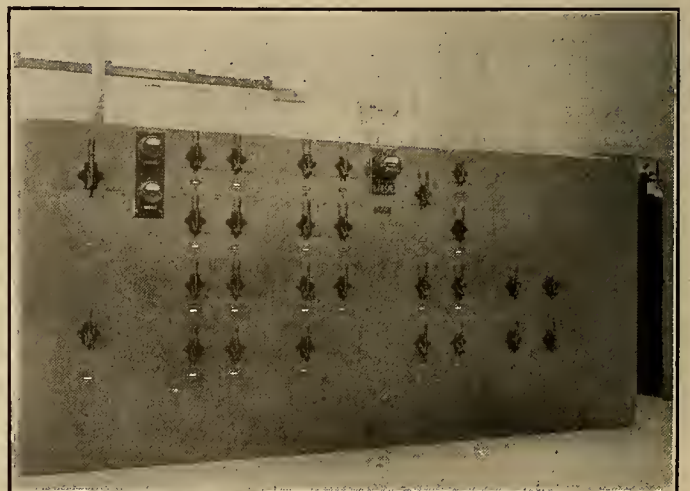
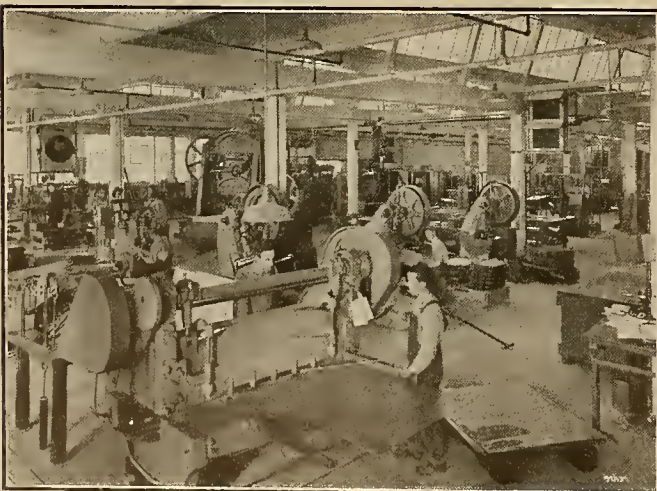
Power Commission Grants Many Western Licenses

The Federal Power Commission authorized the issuance of a joint license to the Feather River Power Company and the Great Western Power Company covering a large project on tributaries of the North Fork of Feather River in Plumas County, Calif. The license is contingent on the securing of the necessary state rights and upon the commission being given the right to have access to all books and records of the companies.

An extension of time has been granted the Snow Mountain Water & Power Company for the completion of its project on the South Fork of Eel River in Lake County, Calif. More time will be required for the completion of the power house at Scott dam to install additional equipment at the Potter Valley power house and to complete the transmission system. It also has been decided to raise Scott dam. The commission has specified a portion of the project which may be completed on or before Jan. 1, 1928, and another portion which must be finished by July 1, 1929.

Reject Wynooche Applications.—The Federal Power Commission has rejected the applications of the City of Aberdeen and the Grays Harbor Railway and Light Company for rights on the Wynooche River on the ground that neither applicant has the requisite state rights and, in addition, on account of the lack of public necessity for the development. Thirty days have been allowed during which the applicants may file an appeal. A report on the status of the Aberdeen project was published in the Journal of Electricity Sept. 15, 1925, p. 225.

Power for Sawmills to Be Developed in Colorado.—James B. Knight, of El Paso, and others have applied to the Federal Power Commission for a preliminary permit covering a project on New River in the Trinity National Forest in Colorado. It is proposed to erect a diversion dam 50 ft. high. The water is to be carried to the power house 12 miles distant through a ditch and a conduit. Some 5,000 hp. of primary power will be made available. The power is to be used for the operation of sawmills.



One of the outstanding features of the new A. G. plant is the complete absence of overhead belts in the machine shop (left), each machine having individual motor drive. At the right is shown the dead-front panel board controlling all of the factory circuits.

Largest Synchronous Condenser Installed at Vaca-Dixon

Recently completed and placed in operation at the Vaca-Dixon substation of the Pacific Gas and Electric Company is the largest synchronous condenser in the world. Installed at the southern terminus of the Pit River 220-kv. transmission system, it will serve to regulate the line voltage so that power from the new Pit 3 power house may be brought down over the existing two transmission lines.

The normal continuous full-load rating of this machine is 40,000 kva. at zero power factor, leading; 3-phase, 60-cycle, 11.5-kv., 600-r.p.m. It was supplied by the Westinghouse Electric & Manufacturing Company. When operating at normal voltage and speed, the condenser will have a normal continuous rating of 25,000 kva. at zero power factor, lagging, provided the field current is reduced to a low value. Operating characteristics of the machine are such that when operating at either of the above ratings the temperature rise of the armature will not exceed 60 deg. C., and that of the field 80 deg. C.

A motor-driven high-pressure oil system provides sufficient pressure at the bearings to float the rotor during the starting period. Forced ventilation is provided by blades carried on the rotor and having a capacity of 80,000 cu.ft. per min. at a velocity of 1,000 ft. per min. Cooling air is conditioned by passing through a Sturtevant air washer.

Starting is accomplished by means of a 3.3-kv., 1,810-hp. motor operating from taps on the transformer secondary; 16,000 kva. is required for starting. The machine is designed to be brought up to full speed in five minutes, during which time the load is

applied gradually. The starting motor is capable of driving the machine for $1\frac{1}{2}$ hours as a generator delivering 25,000 kva. at a power factor sufficient to necessitate an external load of 750 kw. during which time the motor temperature will not exceed 50 deg. C.

Second Electric Home at Provo, Utah, Features Moderate House

The second electrical home displayed in Provo, Utah, under the direction of the Provo Electrical Contractors and Dealers' Association, was highly successful. One of the important messages conveyed to the public was the fact that a medium-sized house of five or six rooms can be so wired as to allow the efficient use of electrical appliances without spending a large sum of money on the wiring, thus dispelling the idea that an electrically equipped home is a luxury beyond the reach of the ordinary individual.

This home has a total of forty-three electrical outlets, nineteen of which are convenience outlets. As an example of correct illumination and the efficient use of electric labor-saving devices and household comforts, it created much public interest, and was visited by a large number of people.

The various appliances, furniture and floor coverings were provided by electrical dealers and merchants of Provo.

The home, which is a modern six-room house of the colonial type, with a laundry and other rooms finished in the basement, was displayed through the courtesy of the owner, Dr. Stanley M. Clark.

Pittsburgh Railways Awarded Coffin Medal 1925.—The Pittsburgh Railways Company has been awarded the Charles A. Coffin medal and prize for 1925.

Two Utility Sales Departments Give Get-Together Dinner

A general get-together dinner was given at the Palace Hotel, San Francisco, on the evening of Oct. 17 last under the auspices of the sales departments of the Great Western Power Company and the Pacific Gas and Electric Company. The purpose of this dinner was particularly to emphasize, promote and foster a spirit of co-operation with the trade back of the load-building campaigns now under way in behalf of the two major central stations in northern California.

A special effort was made to have as large a representation of sales people and executives of the so-called non-electrical outlets as possible, including many of the largest department stores in the east bay district.

An interesting educational program was provided. H. E. Sandoval, president of the Sandoval Sales Company, San Francisco, discussed selling electric water heating and air heating for the electric home. Mr. Sandoval was followed by Frank Pollard of the Heese-man Pollard Company, Oakland, his topic being electric domestic refrigeration. The third and last speaker was Ray Turnbull, sales manager of the Northwestern division of the Edison Electric Appliance Company, Inc., who discussed selling the electric range. All of these discussions were educational in their nature, the speakers taking up the economics of their various subjects, the points of sales resistance and successful methods of overcoming them.

The total attendance was about 275. Of this number a considerable proportion consisted of executive and sales people connected with the largest merchandising concerns of the east bay territory.

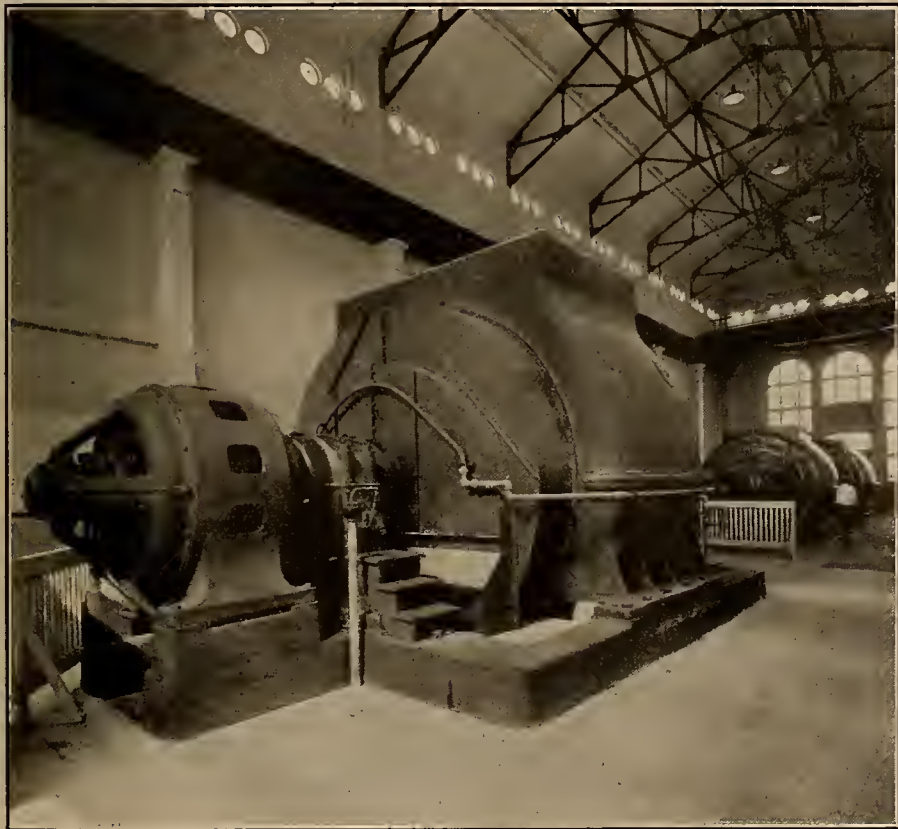
Mokelumne Power Rights Granted San Francisco Man

The Federal Power Commission recently granted a license to J. W. Preston, Jr., of San Francisco, for a part of a proposed development on the North Fork of Mokelumne River, within the Stanislaus National Forest, in Amador and Calaveras Counties, near the towns of Jackson, Volcano, West Point and Pine Grove, Calif. (*Journal of Electricity*, Sept. 15, 1925, p. 213.)

The project includes a rock-fill dam approximately 200 ft. high and 960 ft. long, creating a reservoir having a storage capacity of 60,000 acre-ft. at spillway elevation of 3,860 ft. above mean sea level; a water conduit consisting of approximately 89,000 ft. of open ditch, 30,000 ft. of flume, 2,400 ft. of tunnel, and 1,400 ft. of siphon also is included, and will have a capacity of 350 sec.-ft. The approximate total length of this conduit is 25 miles and will lead from the reservoir, designated as "Salt Springs Reservoir" to a power house.

A power house, called "Tiger Creek Power House," is planned where proposed installation will consist of two 17,500-kva. units. Each unit will consist of two horizontal shafts, double overhung impulse wheels of 10,500 hp. capacity driving a 17,500-kva. generator.

The power capacity of the project is estimated as 22,500 hp. and the average static head is 1,247 ft. The power is intended for public utility use.



New 40,000-kva. synchronous condenser recently installed at Vaca-Dixon substation of the Pacific Gas and Electric Company to provide for additional power from Pit River.

Injunction Granted to Stop Seattle City Plants From Distributing Outside City Limits

In a suit against the city of Seattle and J. D. Ross, superintendent of lighting, the Puget Sound Power & Light Company has been granted an injunction by Superior Judge Austin E. Griffiths, preventing the city from selling light and power outside its city limits. Approximately 1,400 of the 2,000 out-of-town patrons of the light department, largely north of the city limits, are affected by the decision.

The suit was brought last May when the light department began construction of a line to Renton to serve the Savage Lumber & Manufacturing Company. The line never was completed. The city council disclaimed ever authorizing such an extension, and the corporation counsel issued an opinion in which he called attention to the fact that state law prohibits cities from marketing electric current outside their corporate limits. The city's transmission line from the Cedar Falls generating plant runs through Renton, and it was proposed to supply the Savage company by a connection with that line. Judge Griffiths verbally sustained the company's contention that the city has no right so to distribute and will enter a formal opinion to that effect.

A feature of the case was the refusal of T. J. L. Kennedy, corporation counsel, to appear on behalf of J. D. Ross, who was made a party to the suit, because, he said, he had advised Mr. Ross not to attempt to sell electric current outside the city. The latter, therefore, was represented by his own attorney.

Mr. Kennedy sought dismissal of the action on the ground that the city was in no way to blame for the contract made by Mr. Ross with the lumber company, as the city council never has authorized it by ordinance. The corporation counsel also asserted that Mr. Ross made the installation in Renton with funds appropriated for another purpose, and contended that the action should be against Mr. Ross personally and not against the city. Judge Griffiths, however, refused to see this side of the case. "If the position of the counsel for the city is sound," he said, "then, whenever a suit is brought as the result of an official's act, all the city would have to do to get out of it would be to say 'We did not authorize it by ordinance.' Somebody must be presumed to know of the comings and goings of the city's moneys."

Mr. Kennedy gave notice of a motion for new trial, and in case of denial will appeal to the supreme court as soon as Judge Griffiths' opinion is filed formally. Success of the power company in the Renton case, it is believed at the city hall, means other similar actions which definitely will settle the legality of the city's practice in selling electric current to patrons residing outside the corporate limits.

There is, however, some difference of opinion as to what the effect of such actions might be. Approximately 600 suburban patrons of the light department are being served on contracts made prior to 1915, when the law authorizing the city to sell electric current outside city limits was repealed.

For another class of suburban patrons, and this includes the majority of the 1,400 obtained since 1915, the

city delivers the current to a meter at the city limits. The current goes into the meter on the city side and is taken out the other side by the patron who lives over the line. It is believed that the power company plans to bring some test cases to settle definitely what view the courts might take of the latter class of patrons.

A clear-cut victory for the power company, it is pointed out, would not necessarily mean that action would be brought to require the city immediately to relinquish all outside business, as most of the out-of-town patrons are in districts not served by the power company at the present time. The power company, through A. W. Leonard, president, has assured city officials that the decision in the Savage Lumber Company case will not result in any attempt to prevent the city's furnishing electric power to complete the Lake Youngs tunnel contract, a municipal project. Mr. Leonard pointed out the difference in principle between selling electric power to a private concern outside the city limits, for which the city is claimed to have no authority, and furnishing current to a contractor on an important municipal project. Mr. Leonard charged that the superintendent of lighting was taking advantage of a situation to "stir up public resentment against a decision which merely prevented the city from engaging in a purely private business outside its corporate limits."

Pacific Coast Steel Pictures Win Salon Honors

Two photographs taken by R. J. Waters under the direction of C. H. Tallant, advertising manager of the Pacific Coast Steel Company, San Francisco, won salon honors in recent photographic exhibitions held in San Francisco.

A photograph taken in the Pacific Coast Steel Company's factory at South

San Francisco, reproduced herein, was awarded first salon honors for industrial photography at the exhibit of the Photographers' Association of America.

The photograph, also reproduced on this page, of one of the steel towers on the Pit River line of the Pacific Gas and Electric Company, was awarded first salon honors for 1925, in commercial photography, at the exhibition of the Pacific International Photographers Association.

Both of these photographs were used in advertisements printed as front covers for the Journal of Electricity.

School Held for Range Salesmen of Department Stores

Salesmen in department, furniture and hardware stores selling ranges and heavy-duty appliances were given an opportunity to learn more about this equipment in a school which was held in San Francisco recently.

Classes were held Tuesday and Thursday nights over a period of four weeks. The names of those who enrolled were listed and the company employing them was notified of their attendance at each meeting of the class. The course consisted of four lectures on electric ranges, two on water heaters and two on air heaters.

The school was given under the auspices of the Great Western Power Company and the Pacific Gas and Electric Company, with the classes being held in the building of the latter company at 447 Sutter Street. The instruction was given by J. W. Wrenn, assistant sales manager of the Great Western Power Company, and E. M. Marsh, range sales supervisor of the San Francisco district of the Pacific Gas and Electric Company.

Tacoma Man Buys Sherman County, Wash., Company.—The assets of the Sherman County Light & Water Company in Lewis County, Wash., have been sold at a sheriff's sale to H. H. Cleland of Tacoma, for \$35,000. The assets include a pole line from Chehalis to Centralia and a franchise to supply Centralia and Chehalis with lights.



Winners of first salon honors in recent photographic exhibitions. Left: A steel tower on the Pit River line that won first salon honors for commercial photography at the P. I. P. A. exhibit. Right: Interior of Pacific Coast Steel Company plant that won first honors in industrial photography at the P. A. A. exhibit.

Series of Bulletins to Cover Industrial Paint Problems

As a contribution to literature relative to the use of paint in industry W. P. Fuller & Company, San Francisco, are preparing a series of industrial paint bulletins. It is the object to cover in these bulletins all of the important paint problems and many of the lesser ones that arise in industries of all kinds.

Several of the subjects of the bulletins are of particular interest to the electric light and power industry. Following is a partial list of these:

Painting of Engine and Boiler Rooms and Equipment.

Painting Maintenance of Interior Walls and Ceilings of Industrial Plants.

Damp-proofing of Concrete, Brick, Masonry, etc.

Painting Felt and Metal Roofs.

Painting of Industrial Automotive Equipment.

Interior Painting of Power Houses, Substations, and Pumping Stations.

Painting Electric Transmission Lines.

Painting Specifications for Industrial Employees' Homes.

It is the plan of the Fuller company to have the bulletins comprise a reference work on the subject of industrial paints.

Portland Utility Buys Property at St. Helens, Ore.

Acquiring the distribution system and franchise rights of the St. Helens Light & Power Company, St. Helens, Ore., the Portland Electric Power Company, Portland, has added a district containing some 650 customers to its system. Confirmation of this purchase was given out recently following the action of the city council of St. Helens in approving the transfer of the franchise privileges to the purchasing company.

For the time being all the energy needed in the new district will continue to be supplied from the plant of the St. Helens Lumber Company, from which the old operating company purchased power. The plans of the Portland company, however, contemplate the extension of its transmission line from Scappoose to St. Helens, a distance of seven and a half miles, to connect the new district to its own lines. Clyde H. Thayer, formerly in the commercial department of the Portland Electric Power Company, at its St. Johns office, has been appointed resident agent of the new district.

Electrically Welded Pipe Saves Oakland Project \$4,000,000

Eighty-five miles of electrically welded steel pipe to be made by the Steel Tank & Pipe Company of Berkeley, Calif., is provided for in the contracts for the Mokelumne River water supply project of the East Bay Municipal Utility District, Oakland, Calif., which have just been let by the district's directors. Of the \$11,751,427 contracts let, \$10,444,985 has been awarded to Twohy Brothers Company for the pipe lines. The balance is for the construction of a tunnel and pump house.

In the matter of selecting electrically welded pipe, in which the diameters will vary from 60 to 65 in. and heads will range up to 380 ft., the district's board of engineers states:

"The welding of pipe by electric methods is a comparatively new art, particularly for such heavy pipe as required by this aqueduct, and your board has given careful and special consideration to the dependability of this product. Samples of the work have been submitted that show beyond question the possibility of securing a welded joint by this method having 100 per cent efficiency, and the tests required are ample to secure the required efficiency on every joint. Aside from these tests the work is guaranteed by the association of large manufacturers of the highest standing and long experience, and by a heavy bond to guarantee its proper execution. We, therefore, have no hesitation in recommending the acceptance of this method of manufacture, which will save the district more than \$4,000,000 over prices that could be obtained for any other method."

Puget Sound Company Extensions and Improvements Numerous

The Puget Sound Power & Light Company, Seattle, recently started construction of a new power line on the Olympic Highway between Montesano and Elma, which gives a direct route to Elma, and also enables about 30 families between Montesano and Brady to have electric service. The line will cost \$17,000 and will be of 11-kv. construction.

The company also has started survey work for extension of electric power lines across Deception Pass and down the center of Whidby Island. Franchises for the use of highways of Island County and in the town of Oak Harbor are being secured by the company. Deception Pass will be spanned by a cable carrying the wires, suspended by steel towers on either side of the pass, the wires being 120 ft. above the surges of the pass.

The power company also recently finished the complete rebuilding of the light and power distribution system of Concrete, Wash., at a cost of \$10,000. The street lighting system has been improved with new standards, and lines have been extended to every street in the city. The company has "cut in" the new substation in Kelso, Wash., and the system there has been placed in service. A new concrete building will be erected immediately.

L. A. Electric Club Bowling League Is Organized

A bowling league, in which twenty-four teams will represent the numerous electrical interests of Los Angeles, was launched at a luncheon meeting called recently in that city for the purpose of organizing an Electric Club Bowling League. J. A. Sines, southern California representative of the Chicago Fuse Manufacturing Company, was elected president and treasurer of the newly formed league, and A. O. Marston, executive secretary of the Electric Club, was named secretary.

Lake Almanor Tunnel Finished.—The tunnel which is to convey water from Lake Almanor to the power-house site, finished recently, will enable the contractors who are raising the dam at this lake for the Great Western Power Company to fill in the dam to its required increased height. The dam is to be raised 46 ft. higher than its former level.

Edison Company Sets Record in Stock Selling Campaign

Selling \$16,423,200 of company stock to 7,816 stockholders during the first seven months of 1925 is the enviable record established by the Southern California Edison Company in its effort to advance the customer-ownership idea. During the corresponding period of 1924, \$12,924,900 worth of stock was sold to 4,563 stockholders. The 1925 period thus shows an increase in money received of 27.07 per cent and a 71.29 per cent increase in the number of stockholders secured.

Early in 1917 the customer-ownership campaign was launched by the company. At that time there were 2,207 stockholders all told. On July 31, 1925, there were 78,053, showing an average yearly increase in stockholders of 9,480. Of the total number of stockholders more than 90 per cent reside in the territory of southern and central California served by the company and are customer partners, and more than 90 per cent of the individuals comprising the company's operating and construction organization are employee partners.

The largest stockholder of the company owns less than 2 per cent of the total capital stock outstanding, and the sum of the holdings of all stockholders holding \$100,000 or more is less than 15 per cent of the total. More than 75 per cent of the total outstanding stock is owned by over 78,000 stockholders in small holdings of from \$100 to \$10,000. Dividends to the amount of \$31,388,279.90 had been distributed to the stockholders of the company up to July 31, 1925.

A. I. E. E. News

Los Angeles Section will hold its next regular meeting Nov. 3, at 6:30 p.m. in the banquet room of the L. A. Creamery Company, Eleventh and Towne Avenue. The program will include dinner, after which R. W. Sorensen, professor of electrical engineering at California Institute of Technology, will speak on "Scientific Education." Louis Degen, consulting engineer, and R. H. Manahan, city electrician, will speak on the "Evolution of the Fire Alarm System." Following the discussions, an inspection trip will be made to the new central fire alarm station at 2220 West Sixth Street.

Proceedings of Paris International Conference on High-Tension Lines.—If there is sufficient demand, it is planned to publish in English two 1,100-page volumes containing the papers presented at this conference. It is especially desirable that this publication be made, according to P. F. Rowell, secretary of The Institute of Electrical Engineers (England). However, it will be impractical to publish the volumes unless there is sufficient demand, and American engineers interested are requested to communicate at once with A.I.E.E. headquarters. If the demand reaches 800 copies the price will be about \$12, and if 400 copies are subscribed for the price will be about \$20.

Pacific Coast Electrical Association

Sales Promotion Work Will Feature Commercial Section's Activity This Year

Sales, rather than study, were set forth as the objective of the various committees of the Commercial Section, P.C.E.A., at the meeting of the executive committee of that section, Oct. 23, at the office of H. M. Crawford, section chairman, Pacific Gas and Electric Company, San Francisco. In arriving at budget requirements, Mr. Crawford asked for an outline of the work proposed to be done by each committee for the year.

Although some research work is to be attempted, particularly in the electric refrigerator and electric-range and water-heater fields, the major effort of the section for the year will be commercial. Active participation in sales effort, notably in electric truck sales, industrial heating sales, range and water heater sales, appliance sales, and lighting sales, will be fostered by the section, it was brought out in the plans outlined by the committee chairmen or their representatives present at the meeting.

The meeting was opened with a discussion of the Industrial Lighting Activity now being started as part of the national campaign of the N.E.L.A. Clark Baker, chairman of the lighting committee of the Commercial Section, being absent, a report on the Industrial Lighting Activity was asked of A. M. Frost, geographic chairman, Pacific Coast division of the activity.

Mr. Frost described briefly the plan being worked in the division for industrial lighting promotion, and spoke of the organization he has completed for the campaign. G. H. P. Dellmann, Frank Weiss, and Charles Masson, were announced as the vice-chairmen in charge of the activity in the southern part of the state, and C. D. Monteth, H. H. Allison, and H. K. Griffin in charge of northern activity.

Inasmuch as the effort of the electric truck and transportation committee last year was concentrated on the selling of electric transportation to the power companies themselves, the activities of that committee this year, H. H. Singletary, chairman, declared, will be devoted to sales of trucks to commercial customers.

Speaking for P. P. Pine, committee chairman of the electric heating and cooking committee, E. F. Perkins, vice-chairman of the committee, announced the purpose of the committee as more for commercial work than for research this year. The range surveys being conducted by the Northwestern Division, N.E.L.A., are scheduled to be completed early next spring, and instruments being used in that work are to be released at that time. It was felt, however, that the instruments could not be received here in time to conduct for a long enough period the survey contemplated in California to be able to report results at the annual convention of the Pacific Coast Elec-

trical Association next June. Although the survey work is to be started as soon as possible, major effort of the committee this year is not to be devoted to this problem.

The electric heating and cooking committee, however, is to make an analysis of the growth of range and water-heater sales, and of the sales policies used, and is to make a determination of which policies are best.

Considerable discussion resulted from the suggestion that some standardization be sought in the matter of the switch apparatus required in various localities in connection with electric ranges and water heaters. Mr. Frost advocated a liaison with the Technical Section of the Association to bring to its attention the necessity for a consideration of the commercial aspects of installation requirements.

Frank Boyd, as chairman of the power committee of the Section, outlined the plans for his committee's work as the concentration of effort to promote industrial heating installations. Commending the work of the Committee on the Relation of Electricity to Agriculture, and saying that no work of his committee could do more than duplicate the fine work being done in agricultural power development by this agency, Mr. Boyd said that he had decided that a concentration on industrial heating was a logical step. His plan contemplates the issuance of a small bulletin setting forth the electrical industrial heating applications in the West, as a medium of promoting a development of that business. A slide lecture on industrial heating applications also is planned for use by power company representatives in sales talks or talks before business organizations.

In outlining the work necessary in the appliance committee, J. W. Wrenn, chairman of the committee, promised an intensive appliance sales effort. The booklet issued by the California Electrical Bureau was commended and advocated as an excellent piece of printed matter to use in connection with appliance work. H. C. Rice, of the Southern California Edison Company, Los Angeles, described successful co-operation between power company and the Electragists of Los Angeles in conducting thirty-day specials on some predetermined appliance, each dealer or power company making his or its own special, but tying in with the general advertising effort put forth for the sale of that appliance that month.

Electric refrigeration, as a desirable load-builder and one of the best appliances for sale on lighting circuits, was held out to the appliance committee as a subject for special consideration.

Lloyd Henley, chairman of the customer service committee, called on H. K. Griffin, chairman of that committee last year, for an expression of an

opinion as to work that his committee would have wished to see carried on. The preparation of the manuals by that committee last year were complimented highly by the individual members of the executive committee. Mr. Griffin suggested that there was a field open for the application of the manual in many localities, and spoke of the probability that questions of importance to be considered by this committee would come forth in number in the first meeting of the committee. It was suggested, too, that the manual be expanded to cover other conditions than those treated in a general way in it.

The next meeting of the Commercial Section, a meeting of the entire section, was scheduled for Nov. 19-20, in San Francisco.

Accident Prevention Committee Subjects Assigned

Better to crystallize the activities of the members of this committee as well as the committee as a whole, definite subjects have been assigned to each of the members of the committee for study during the year. A list of the subjects and those to whom they were assigned is given below:

"Accident Statistics," G. W. Lyons, Great Western Power Company, San Francisco.

"Apparatus and Devices," P. B. Garrett, Westinghouse Electric & Manufacturing Company, San Francisco.

"Identification of Cables," P. F. Melnick, Los Angeles Gas & Electric Corporation, Los Angeles.

"Lighting," G. C. Rucker, Holophane Glass Company, San Francisco.

"Safe Practices," M. S. Slaughter, The Southern Sierras Power Company, Riverside, Calif., and W. L. Smith, Los Angeles Bureau of Power and Light.

"Safety Bulletins," F. V. Wright, The Southern Sierras Power Company, Riverside.

"Safety Code," S. C. Dickenson and C. A. Jordan, Pacific Gas and Electric Company, San Francisco.

"Safety Instruction Courses," L. L. Dyer, S. C. Haver and D. J. Kennelly, Southern California Edison Company, Los Angeles.

"The Foreman," W. E. Richmond and E. D. Sherwin, San Diego Consolidated Gas & Electric Company, San Diego.

"Tools," S. M. Bullis, California Oregon Power Company, Medford, Ore.

N.E.L.A. Selects Atlantic City for Next Convention

The forty-ninth convention of the National Electric Light Association will be held on Young's Million-Dollar Pier, Atlantic City, May 17-21, 1926, inclusive. Contracts have been signed and general plans for the convention completed.

A manufacturers' exhibition will be held in connection with the convention. The exhibit will be on the Million-Dollar Pier, as in previous years, and it is anticipated that more space than ever before will be devoted to the exhibits. The exhibition committee is now at work on floor space plans and general arrangements and will be prepared to make definite announcements in the near future.



News of the Electragists



California Electragists Discuss Trade Policy and Business Problems

Trade policy, electrical merchandising by contractor-dealers, and financial and business problems confronting the members of this branch of the industry, were the three major topics discussed at the second quarterly meeting of the California Electragists, Southern Division, which was held at Lebec, Oct. 16-17.



C. J. (Cy) Geisbush and W. F. (Bill) Brainerd (the caddy) snapped as they returned from the golf links. The success of the convention of the California Electragists, Southern Division, which was held at Lebec, was due largely to their efforts.

A members' meeting was held Friday evening, Oct. 16, with Harry Walker, president of the California Electragists, presiding. He stated the members' meeting was the first on the program following a precedent established at Eureka at the annual meeting of the Northern Division.

C. J. Geisbush, executive secretary, reported on his attendance at the meeting of the Association of Electragists, International, which was held at West Baden, Ind. He emphasized the report of the trade policy committee and its effect upon every member of the Association. The California Electragists, Southern Division, went on record as endorsing the trade policy as adopted by the A.E.I.; that is, that distribution of electrical supplies shall be from manufacturer to jobber to contractor-dealer to consumer.

Merchandising Section

The merchandising section held its meeting Saturday morning. O. N. Robertson, Santa Ana, called the meeting to order. This session was attended by over 100. This was the first business session of the electragists that was attended by women, and fourteen took advantage of the opportunity to be present. The Southern Division has taken the lead in asking the women to take an active part in its meetings.

Electrical merchandising from the standpoint of the contractor-dealer was the subject of a special committee appointed at the San Diego meeting of the organization. The committee concentrated its efforts on the effect of the marketing of electrical merchandise by the central station. The report stated that the central station branch of the industry is going to sell electrical merchandise, and on a scale never before attempted; that for the most part their programs contemplate a close tie-in with the retail dealer; and that the whole industry recognizes the fact that if the contractor-dealer is to play the part expected of him he must be assured a net profit on his transaction. The report presented a very comprehensive picture of the merchandising problems before the industry. In order that a larger number may read this

report, it is published on another page of this issue.

H. C. Rice, appliance sales agent of the Southern California Edison Company, outlined the proposed merchandising activities of that company during 1926. He stated monthly specials would be featured, using one particular appliance during each month; these programs will be planned three months in advance so that the dealers will be able to prepare to tie-in with these specials. Mr. Rice said that dodgers would be sent to all of their consumers with their bills calling attention to these specials and also stating that the appliances featured could be purchased at other electrical dealers' stores at the same price.

A. M. Frost, sales manager of the San Joaquin Light & Power Corporation, urged that a committee be appointed to act as a contact point with



R. F. Doll (right) of Glendale won the golf driving contest; and M. T. Dacus, Ontario, was second. Mr. Dacus was the winner in the golf tournament.

the central stations. He also suggested that this committee meet with all of the central stations in California and endeavor to have them adopt uniform merchandising plans. Mr. Frost suggested that grievances against the central station companies should be taken up with the company involved so that they might be adjusted. He



An interested group of "fans" who watched the baseball game between the electragists and the jobbers and manufacturers, and the electragists' team which was victorious.

said business must be profitable for the dealer in any merchandising program.

Education of the individual branches of the industry was discussed by D. C. Pence, manager of the illuminating department of the Illinois Electric Company.

The following permanent executive committee of the merchandising section was appointed by H. H. Walker: C. A. Rowley, Pasadena; O. N. Robertson, Santa Ana; D. D. MacFarlane, Los Angeles; E. F. Gielow, Anaheim; and A. M. Fitch, Pomona.

In a baseball game following the meeting, the electragists defeated the jobbers and manufacturers.

General Open Meeting

"Know Your Business" was the title of a business guide prepared by the electrical supply jobbers of Los Angeles that was presented at the general open meeting held in the afternoon. The subject was treated under three major heads: the business within itself; the business in its relation with a bank; and the business in its relation with the jobber. All of these subjects were given detailed treatment.

Topics treated under the first head included: organization, overhead, capital, accounting, method of handling all



O. N. Robertson, chairman of the merchandising section of the California Electragists, Southern Division, and A. M. (Jack) Frost, sales manager of the San Joaquin Light & Power Corporation, spent a great deal of time together at the Lebec meeting of the electragists discussing merchandising problems.

classes of sales, lien rights, costs, financial statement, credit extension, collection of accounts receivable, relation of turnover to net return, merchandise investment, proper purchasing, and cash discount.

Charts and diagrams were used to present more clearly certain phases of the work. Various members of the organization stated the whole treatise was one of the most complete, interesting and constructive papers that ever has been presented to a contractor-dealer organization. The report was received so enthusiastically that the jobbers decided to publish it in its entirety as a textbook for electragists.

Another members' meeting was held following the open meeting. Trade policy was again the major topic of discussion, and reports were received from men from various districts upon conditions that existed in their particular localities.

Ladies not attending the afternoon meeting played bridge and five-hundred. Handsome prizes for the winners were awarded in the evening at the banquet, which was followed by dancing.

Contractors Hear Addresses on Proper Industrial Lighting

Contractors in the San Joaquin Valley of California from Merced to Taft, were told the story of proper industrial lighting at a meeting in Fresno on Oct. 14 and one in Bakersfield on Oct. 15. The Fresno meeting was held in the San Joaquin Power Building and in the carbarn auditorium in Bakersfield.

A. M. Frost, Pacific Coast geographic chairman of the industrial lighting committee of the N.E.L.A., called the meeting to order. He spoke of the industrial lighting activity as an aftermath of the Home Lighting Contest which produced such satisfactory results. Mr. Frost then explained the work of the various committees and the fields to be reached as including all lighting not considered as home lighting and store lighting. This will embrace garages, machine shops, factories and similar places.

Leo Giannini of the Edison Lamp Works of the General Electric Company was then introduced by Mr. Frost. Mr. Giannini gave a most interesting and instructive talk on the laying out of shop illumination. He illustrated the elementary principles of light and reflection and the meaning of a foot candle of illumination.

Four fundamentals of proper lighting as given by Mr. Giannini are: 1. Sufficient light; 2. Freedom from glare; 3. Proper distribution—freedom from dark spots, and uniformity; 4. Simplicity.

He expressed the opinion that the ideal unit to be recommended for most shop practice was the R.L.M. standard dome reflectors with a bowl enamel Mazda C lamp.

The meeting room next was considered as a shop, and a proper lighting layout was made. Pamphlets were distributed that gave all the tables necessary to do this work, and each step was followed closely by those present.

Several other typical layouts were made. The men in attendance were given sufficient information to enable them to design an industrial lighting job which would produce satisfactory illumination.

Thirty-four of the seventy people in attendance at the Fresno meeting were contractors. Ten of the twenty-two present at Bakersfield were contractors from Bakersfield and Taft.

The Standard Electric Company, Van Nuys, Calif., has opened a new store on Sylvan Street.

The G. & L. Electric Company of Beverly Hills, Calif., has moved into a larger and better store on Canon Drive.

The Model Electric Company of Compton, Calif., recently moved into a larger store. A. C. Nygaard is the proprietor.

C. E. Stanley, formerly at 511 East Channel Street, Stockton, has moved to a new location at E. Miner and Wilson Way in that city.

T. P. Mosso, who was forced to retire from active business on account of ill health, again has entered the electrical contracting business in Los Angeles.

Max Rosenthal, head of the electric contracting firm of Williams & Rose in Denver, has joined with a Denver group in the leasing of valuable downtown property for the possible erection of a large hotel building.

C. J. Geisbush, executive secretary of the California Electragists, Southern Division, has returned from the convention of the Electragists, International, at West Baden, Ind.

George L. Black, formerly manager of the Field Electrical Company, San Bernardino, Calif., recently has entered business for himself as an electrical contractor and engineer in that city.

D. L. Davis of the Davis Electric Company, Ontario, Calif., has opened the D. and E. Electric Shop in Uplands. Beatty Eason has charge of the contracting and retailing business of this branch.

E. G. Sheibley, chief engineer and assistant superintendent of the Industrial Accident Commission, recently addressed the Los Angeles Electrical Contractors and Dealers' Association on the new State Code.

C. F. Butte, Edward Martin, Victor Lemoge, and E. E. Browne, all of San Francisco, and H. H. Courtright of Fresno were in Los Angeles recently attending a meeting of the state executive committee of the California Electragists.

Fred Ayres has recently joined the H. H. Walker organization in Los Angeles as merchandising and advertising manager. Mr. Ayres has been connected with the Bullock Department Store in a similar capacity for the last five years.

S. F. Jones has acquired complete ownership in the firm of Winder & Jones, electragists of Covina, Calif., with branches at Azusa and Glendora, upon the retirement of R. B. Winder. The business will continue to be operated under the same firm name.

Bakersfield Contractors Discuss Industrial Illumination.—Industrial illumination as it affects the contractor-dealer was the subject at a recent meeting of the Electric Contractors' Security Alliance of Bakersfield, Calif. D. C. Pence, manager of the illuminating department of the Illinois Electric Company, Los Angeles, addressed the meeting.

A. A. Leithold has sold the Glendora Electric Company, 121 N. Michigan Avenue, Glendora, Calif., to J. N. Searles, an engineer from Mazetta, Minn. Mr. Searles is remodeling the entire interior of the store so that the electrical, radio, and fixture departments will be separated. A special art goods department will be installed and managed by Mrs. Searles.

Contractors Sponsor Dinner Dance.—San Francisco electrical contractors sponsored a semi-annual get-together party of the electrical industry of that city Oct. 10. Redwood Lodge in Marquard's restaurant was reserved for the dinner dance which was enjoyed by 140. Three gate prizes were awarded during the evening. Charles Shipman, David Carlson, Charles Lyman and Ed Dowd were in charge of the arrangements.

All-Metal Standard of Wiring May Be Enforced in Denver Suburb.—The all-metal standard for electrical wiring which is required in Denver will be required in Englewood, Colo., if a planned campaign of annexation to Denver is successful. In the meantime, the electrical ordinance which was introduced early in the spring has been abandoned and return made to the old regulations permitting knob-and-tube installations with only nominal inspection.

Meetings

Highway Lighting Held Solution of Headlight Problem

That the difficult problem of regulating automobile lighting on highways must be solved eventually by the only sensible method possible, namely, better highway illumination, was one of the many ideas presented by Louis F. Leury, consulting electrical engineer and president of the San Francisco chapter of the A.I.E.E., at a recent meeting of the San Francisco chapter of the Illuminating Engineering Society, to which members of the A.I.E.E. were invited. Mr. Leury spoke of the relation of the electrical engineer to illuminating engineering.

The meeting also was addressed briefly by A. W. Copeley, general engineer for the Western offices of the Westinghouse Electric & Manufacturing Company, and member of the executive committee of the A.I.E.E.

Sketching a "picture of the field," as he said, Mr. Leury detailed the opportunities for co-operation between electrical and illuminating engineers with particular reference to the Pacific Coast. He pointed out the possibilities for development of electric illumination in the industrial, commercial and residential fields of the West, and declared the field was wide open for such work. Another of the high points of his address was his advocacy of the retention of electrical engineers by commercial and industrial organizations, in order that electrical installations, such as good lighting installations, might be saved from the disaster of going to rack and ruin for lack of attention and of a continuity of policy which would keep them up to date.

Women Organize in Northwest and Schedule First Meeting

Setting the time and place of the first meeting of the Women's Committee of the Public Relations Section of the Northwest Electric Light and Power Association as Oct. 23, 1925, at Salt Lake City, Mrs. L. A. McArthur, wife of the vice-president and general manager of the Pacific Power & Light Company, Portland, chairman of the committee, announced plans of organization and activity among the women of the electrical industry in the Northwest that promise to assist materially in the public relations work carried on by the various companies. It was expected that prior to this meeting a number of sectional committees would have been formed by the women in the different company organizations in the territory so that each company representative might bring to the general meeting ideas from which would be co-ordinated the work of the general committee for the year.

The scheme of organization has been to place upon the association committee one or more representatives from each of the member companies, these representatives to act as chairmen of women's committees formed in their own companies. A large number thus are enlisted, and machinery is provided to

carry out plans and activities formulated and suggested by the association committee. Two innovations have been injected into the formation of this committee: a special effort has been made to interest the wives of men employees, and a women's committee from among the jobbers and manufacturers is to be included on an equal basis with those of the power companies.

The personnel of the committee, besides the chairman, is as follows: Eva Osborne, Utah Power & Light Company, Salt Lake City; Mrs. Nina J. Johns, Idaho Power Company, Boise; Nelle Duffey, Puget Sound Power & Light Company, central district, Seattle; Bertie Neil, Puget Sound Power & Power Company, southern district, Vancouver, Wash.; Mary K. Walsh, The Washington Water Power Company, Spokane; Mrs. Perry Crawford, The California Oregon Power Company, Medford, Ore.; Marguerite Butler, Portland Electric Power Company, Portland; Mrs. D. Southwick, Pacific Power & Light Company, Portland; Ellen McCurdy, Pacific Power & Light Company, Walla Walla, Wash.; Hilah Brick, Bend Water, Light & Power Company, Bend, Ore.; Miss Dorgan, Mountain States Power Company, Albany, Ore.; Mrs. E. G. Robinson, Molalla Electric Company, Aurora, Ore.; Anna Gyllenberg, Eastern Oregon Light & Power Company, Baker, Ore.; Mrs. A. W. Angell, Northwestern Electric Company, Portland; Esther Miller, Grays Harbor Railway & Light Company, Aberdeen, Wash.; Edna Comstock, Oregon Public Utilities Information Committee, Portland; and Clara Redheffer, General Electric Company, Portland.

COMING EVENTS

Publicity Section, Pacific Coast Electrical Association—

Palace Hotel, San Francisco,
Nov. 19, 1925

Executive Committee, Pacific Coast Electrical Association—

Office of the Secretary, San Francisco,
Nov. 20, 1925

Commercial Section, Pacific Coast Electrical Association—

San Francisco,
Nov. 19-20, 1925

California Electrical Bureau—

Executive Committee Meeting, San Francisco
Nov. 19, 1925

Fourth National Radio Conference—

Washington, D. C.,
Nov. 9, 1925

National Association of Railroad and Utilities Commissioners—

Kansas City, Baltimore Hotel
Feb. 9-12, 1926

Electrical Bureau Fills Board Vacancies

To fill the vacancies in the advisory committee of the California Electrical Bureau, a special meeting of that committee was called to order by C. E. Heise, following the meeting of the San Francisco Electrical Development League, Oct. 12.

P. H. Booth, president of the Edison Electrical Appliance Company, Inc., Los Angeles, was appointed to fill the vacancy made by the retirement of H. B. Squires from the committee; and to fill the vacancy made by the advancement of P. H. Booth, already a member of the committee, H. E. Sandoval, president of the Sandoval Sales Company, San Francisco, was named.

Book Reviews

HENDRICKS COMMERCIAL REGISTER

(Thirty-third edition.)

Hendricks Commercial Register, 70 Fifth Avenue, New York, and 18 East Huron Street, Chicago. \$12.

The claim that this directory of business establishments is the most complete in existence is well justified in the most recent edition, the thirty-third, brought out by the publishers recently. Its particular feature is the elaborate and complete cross-indexing, making for the greatest facility possible in the finding of information contained in it.

This particular register enjoys a unique position in business reference media in that it physically manifests the results of almost thirty-five years of painstaking endeavor. The register, nevertheless, makes use of the modern methods of classification. It serves as an excellent guide to industrial concerns who wish to purchase materials or machinery in the most efficient and economical way.

Although a large volume, it is arranged typographically so as to contain the maximum in information in convenient form. It is a most complete directory of the products of American manufacture, and should enjoy a well deserved prestige among men who buy or specify. Manufacturing and jobbing establishments, as well as contractors, architects and engineers should derive much value from the possession of the latest edition of the register for immediate reference.

NATIONAL DIRECTORY OF COMMODITY SPECIFICATIONS

Department of Commerce, Bureau of Standards, George K. Burgess, Director. 379 pages. Cloth bound. Listed as Miscellaneous Publications No. 65. August, 1925. \$1.25. Sold only by Superintendent of Documents, Government Printing Office, Washington, D. C.

This authentic publication is designed to further the economy which can be realized in the purchase of commodities by the use of specifications. Real competitive bidding and the delivery of satisfactory material may be insisted upon through the wide use of definite specifications. Information regarding the best-known specifications for more than 6,000 commodities is given in convenient form in this directory. Specifications in general use are given, by whom these were prepared and where copies may be obtained. There is also an alphabetical list of commodities.

Census of Electrical Industries Published.—The Bureau of Census of the U. S. Department of Commerce has published the 1922 report on central electric light and power stations. The report is published quinquennially, the first one covering the year 1902. Among other subjects the report covers: Summary for the Industry; Development of Hydroelectric Power; Primary Power Equipment; Generating and Subsidiary Equipment; Transmission Lines and Output; Financial Statistics, and Employees, Salaries and Wages.

Personals

F. R. Jamison, former Texas newspaper publisher, recently has been appointed director of publicity for the Public Service Company of Colorado, Denver. In this position he will combine and supervise the publicity and advertising activities throughout the various districts in the state of Color-



F. R. JAMISON

ado and Wyoming where the company's interests are located. Mr. Jamison for several years was engaged in the newspaper business in Texas, having owned and published for some time the Canadian Record, at Canadian, Texas. He was interested also in several other Texas papers and was prominent throughout the state in newspaper channels. In 1908 he was responsible for the organization of the Panhandle Press Association, which is said to be the largest district press association in the United States. He became associated with the Doherty interests in Texas some years ago and after a short period of service with the Doherty organization in the state of Texas was transferred to the New York office in what is known as the Customers' Ownership Division of the securities department. In 1924 he went to the Colorado company as advertising and publicity counsel. Mr. Jamison has had wide experience in organization work. He will have headquarters in Denver under the new appointment.

F. G. Philo, formerly with Stone & Webster, Inc., with headquarters in Boston, has joined the staff of the Southern California Edison Company, Los Angeles, as assistant superintendent of steam generation in charge of the Long Beach steam plant. While with the Stone & Webster organization Mr. Philo was preliminary operating engineer, a position which required that he keep in close personal touch with the final stages of construction of steam plants and take charge of the initial stages of their operation.

B. C. Rowley, manager of the Edison Electric Appliance Company, Inc., of Salt Lake City, was among those who attended the convention of the Rocky Mountain Division of the N.E.L.A. at Glenwood Springs, Colo.

R. E. Fisher, vice-president in charge of public relations and sales, Pacific Gas and Electric Company, has returned to San Francisco after an extended trip through Eastern manufacturing and financial centers.

S. H. Taylor, secretary, Pacific Coast Electrical Association, San Francisco, has returned from Chicago where he attended the meeting of the executive committee of the N.E.L.A.

T. S. Wood, Northwest representative of the Packard Electric Company, Warren, Ohio, has been elected vice-president of the Electric Club of Seattle.

L. B. Gowan, of the Lighting Service Bureau of Salt Lake City, attended the Illuminating Engineering Society convention held recently at Cleveland, Ohio.

Harry Farquhar, formerly with the Oakland works of the General Electric Company, and **John W. Massie**, formerly with the switchboard department of the General Electric Company, have formed a partnership under the name of Electrical Repair & Equipment Company in San Francisco.

K. C. Schluss, formerly superintendent of power and equipment of the southwestern district of the Puget Sound Power & Light Company, Tacoma, Wash., has been promoted to be general superintendent of the Western United Gas & Electric Company, Aurora, Ill., a company managed by Stone & Webster, Inc.

C. L. Hill, formerly assistant superintendent of power of the southwestern district of the Puget Sound Power & Light Company, Tacoma, Wash., has been promoted to be superintendent of power, taking the place of K. C. Schluss.

J. H. Fenton, manager industrial division of the Los Angeles office, Westinghouse Electric & Manufacturing Company, has returned from Seattle where he attended a conference.

Fred Hazard, formerly in the washing machine business in Denver, has been named manager of advertising and sales promotion of the Servel Corporation with headquarters in New York City.

G. W. Hamilton, turbine engineer, Westinghouse Electric & Manufacturing Company and a member of the Los Angeles office for the past two years, has been transferred to the Chicago office and will take up his duties there shortly.

L. C. LaMont, office manager, Westinghouse Electric & Manufacturing Company, Los Angeles, recently spent some time in the Phoenix office of the company.

G. A. Riley, assistant superintendent of distribution, Los Angeles Gas and Electric Corporation, Los Angeles, will head the overhead systems committee, P.C.E.A. Technical Section, for 1925-26.

T. J. Gibson, formerly of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, is now in Los Angeles, having assumed the duties of manager of the Westinghouse Acceptance Corporation in that city. **K. C. McMasters**, formerly assistant to L. P. Lee, treasury representative, has been made assistant to Mr. Gibson.

F. R. Kohnstamm, manager of the appliance department, Mansfield Works of the Westinghouse Electric & Manufacturing Company, recently was in Los Angeles on a short business trip.

J. G. Stuart, with the Pacific States Electric Company, Seattle, was a recent visitor in San Francisco.

J. M. Buswell, who has been named chairman of the accident prevention committee of the Technical Section of the P.C.E.A. for the second year, is especially well fitted for this post. He is particularly interested in safety work, and it was primarily through his efforts that the committee was organized and accepted as such at the beginning of the fiscal year 1924-25.

J. C. Gaylord, of the engineering department, Southern California Edison Company where he is engaged in substation design and layout work, is the new head of the electrical apparatus committee of the P.C.E.A. Technical Section.

Walter Dreyer, assistant engineer, division of civil engineering, Pacific Gas and Electric Company, San Francisco, has been appointed chairman of the P.C.E.A. Technical Section's hydraulic power committee. Mr. Dreyer was connected intimately with the hydraulic developments of the company's Pit River project.

R. E. Jones, head of the meter department, The Southern Sierras Power Company, Riverside, Calif., has been appointed to the chairmanship of the P.C.E.A. Technical Section's meter committee.

R. L. Wood, Utah Power & Light Company, Salt Lake City, recently visited the Pacific Coast, spending some time in San Francisco.

L. B. Gawan, of the Lighting Service Bureau, Salt Lake City, recently attended a convention of the Illuminating Engineering Society in Detroit. He also spent some time visiting the laboratories of the National Lamp Works in Cleveland where new developments in lighting were on display.

J. G. Rollow, consulting engineer, Los Angeles Gas and Electric Corporation, Los Angeles, is vice-chairman of the executive committee of the P.C.E.A. Technical Section.

E. G. Miller, recently elected treasurer of the Southern California Edison Company, Los Angeles, has made a rapid rise in the public utility world. Less than ten years ago he joined the Southern California Edison Company in the



E. G. MILLER

accounting department. From there he went to the insurance department and then to the secretary's office as assistant secretary. His grasp of financial problems paved the way to his appointment as acting treasurer early in 1925. His election as treasurer followed as a natural consequence.

H. W. Crozier, of the Federal Light & Traction Company of New York City, recently made an inspection trip through the Grays Harbor and Olympic peninsula district in the state of Washington, for the purpose of gathering information on the hydroelectric possibilities of the region. The Federal company is the parent organization of the Grays Harbor Railway & Light Company, operating in Aberdeen and Hoquiam, and contemplating large power developments on the Olympic peninsula. Mr. Crozier was accompanied by G. L. Parker, district manager of the United States Geological Survey.

H. E. Barden, who has been connected with the Southern California Edison Company for fourteen years in an engineering capacity, has resigned to accept the position of district representative of the Pacific Coast Building-Loan Association in the Santa Monica district.

H. V. Busby, chief clerk in the Compton district of the Southern California Edison Company, has been transferred to the corresponding position in the Santa Barbara district. His successor at Compton has not yet been named.

D. W. Chamberlain, of the Globe Electric Company, Seattle, has been appointed treasurer of the Electric Club of that city to succeed E. A. Irons of the Westinghouse Lamp Company, who recently resigned. Mr. Chamberlain also becomes a member of the executive board of the club.

W. R. Mathews, formerly of the engineering department of The Washington Water Power Company, Spokane, has been appointed illuminating engineer to function in the commercial department under Lewis A. Lewis, sales manager. Mr. Mathews was born in Minnesota in 1898, but his family soon moved to Spokane where he went through grade and high school. After two years at Washington State College, Pullman, he went to the Massachusetts Institute of Technology, Boston, graduating in 1921 with the degree of B.S. in electrical engineering. He supplemented this education with one year's graduate work, taking an M.S. in 1922, and also completed the student en-



W. R. MATHEWS

gineering course of the General Electric Company. Returning to Spokane, he entered the employ of The Washington Water Power Company in the engineering department. In December, 1923, he was transferred to the commercial department as illuminating engineer.

W. A. Brackenridge, senior vice-president of the Southern California Edison Company, Los Angeles, was a recent visitor in San Francisco.

A. H. Tracy, with the Byllesby Engineering & Management Corporation, Chicago, recently spent a few days in San Francisco.

J. E. Kewley has been appointed general manager of sales for the The National Lamp Works of the General Electric Company, Nela Park; Cleveland, Ohio, and T. K. Quinn has been made assistant general manager of sales. W. G. McKittrick will be manager of the sales department, which hereafter will embody under this one head what was previously two departments, one covering large lamp sales and the other miniature lamp sales.

C. D. Wilson, electric battery and service dealer of 1717 W. Sixth Street, Los Angeles, has been appointed local representative of the Elwell-Parker electric industrial trucks and tractors distributed by the Ira G. Perin Company of San Francisco, who are Pacific Coast distributors for the Elwell-Parker Company.

W. P. Bear, formerly with the Magnavox Company, Oakland, has become associated with the Pacific Gas and Electric Company, San Francisco.

G. I. Drennan, formerly traveling inspector for the Pacific Power & Light Company, Walla Walla, Wash., has been made field superintendent for that utility.

L. J. Brown, formerly assistant sales manager of the Western Electric Company, San Francisco, was appointed stores manager of the San Francisco office effective Oct. 1. P. W. Todd, formerly stores manager for the same company in San Francisco, has been transferred to the Los Angeles office as stores manager.

P. S. George, manager of the commercial department of the Coast Valleys Gas & Electric Company, Salinas, Calif., attended the meeting of the California Association of Electrical Inspectors which was held recently in Fresno. S. F. Butler, city electrician of Salinas, made the trip with him.

D. W. Proebstel, electrical engineer, light and power department, Portland Electric Power Company, Portland, lately visited San Francisco and Los Angeles and other power centers.

H. G. Steele, president, and Carl Johnson, vice-president, respectively, of the U. S. Electrical Manufacturing Company, Los Angeles, were recent visitors in San Francisco.

A. S. Merrill, general sales manager, Appleton Electric Company, Chicago, has lately returned from a trip to the Pacific Coast where he called on the branch offices of the company in Los Angeles and San Francisco. He also visited Seattle where he established a new office at 71 Colombia Street, which will be under the direction of C. H. Shoemaker.

Carl W. Wiggins, superintendent of electric production, San Diego Consolidated Gas & Electric Company, San Diego, Calif., returned a short while ago from a trip to Chicago, Minneapolis and St. Paul. In the latter city he attended a convention of the National Association of Stationary Engineers. In Minneapolis he visited H. H. Jones, former president of the San Diego company and now vice-president in charge of operation, Northern States Power Company.

Arthur Prager, who is serving as first vice-president of the Rocky Mountain Division, N.E.L.A., and who will assume the presidency July 1, 1926, as a result of his election at the recent Glenwood Springs convention, is the manager of the Albuquerque Gas & Electric Company, Albuquerque, N. M., a Federal Light & Traction Company holding. Mr. Prager was born in Trinidad, Colo., in 1890, and attended the public schools in that city. After graduating from high school he started his business career with the Trinidad Electric Transmission, Railway & Gas Company as a meter reader and col-



ARTHUR PRAGER

lector. In 1910 he was appointed auditor of that company and also had charge of the accounting departments of other Federal companies, including the Albuquerque Gas & Electric Company, Deming Ice & Electric Company, Deming, N. M., and the Springfield Gas & Electric Company, Springfield, Mo. He was named manager of the Albuquerque company in 1917 and resigned to enlist in the army. Starting as a private he was discharged with the rank of major, returning to Albuquerque on Jan. 1, 1919. Mr. Prager formerly served as a vice-president of the Rocky Mountain Division N.E.L.A. and is a past president of the New Mexico Electrical Association.

Obituary

Thomas Franklin Manville, chairman of the board of directors of Johns-Manville, Inc., died Oct. 19, in New York City. He was one of the country's great business builders. For the past twenty-five years he has been the directing head of Johns-Manville, Inc., the world's largest producers and manufacturers of asbestos, and during that time he has built up an outstanding organization fully capable of carrying on his plans and policies. Mr. Manville was president of the Arizona Asbestos Company, treasurer and director of the Asbestos Wood & Shingle Company, president and director of the Canadian Johns-Manville Company, director of The Fibre Corporation, director of the Fifth Avenue Bank, and trustee of the Franklin Savings Bank.

TRADE NOTES

W. N. Matthews Corporation, St. Louis, Mo., has revised all price and discount sheets covering its line of electrical specialties. Many reductions in prices have been announced.

Detroit Stoker Company, Detroit, has issued a new 32-page bulletin describing the Detroit underfeed stokers of the single-retort type. The bulletin also contains a number of fuel bed cross-sections, showing conditions of the fire with respect to air distribution and movement toward the dumps.

General Electric Company, Schenectady, has issued recently a new booklet entitled "Planning and Judging Street Lighting." The book is illustrated with photographs showing new types and designs of street lights.

Harold E. Trent, Philadelphia, Pa., has placed a new soldering iron appliance on the market, which it is claimed has the ability to heat up to soldering temperature and to maintain such a temperature indefinitely.

Brown-Instrument Company, Philadelphia, has issued catalog No. 74, which describes and illustrates the Brown recording pressure and vacuum gauges.

Hynes & Cox Electric Corporation, Albany, N. Y., has issued a folder descriptive of its electric glue pot, which it is claimed has many advantageous features.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has placed on the market recently a new and complete line of 25- and 60-cycle squirrel-cage and slip-ring induction motors equipped with Timken tapered roller bearings.

The Electrical Engineering Service, New York City, has issued a circular describing a new instrument which it is claimed is an improvement in the measurement of electric current. It is called the Avotester, derived from ammeter, voltmeter, ohmmeter in one.

The Hisey-Wolf Machine Company, Cincinnati, has issued recently Bulletin No. 107, describing and illustrating the latest Hisey electric drill, equipped with a standard Hisey motor.

P. E. Chapman Electrical Works, St. Louis, Mo., has issued recently bulletin No. 120, giving a description with prices and illustrating its taping machines.

Goheen Corporation of New Jersey, Newark, N. J., whose New York office is at 331 Madison Avenue, has issued a new folder on Galvanum, its special paint engineering product for painting galvanized iron. Galvanum, which has been on the market for over thirty-seven years, is claimed by the makers to be particularly suitable for industrial buildings, sheds, warehouses, garages, and all other galvanized iron buildings.

H. J. Gute & Company, San Francisco, will handle the Blenden-Dun line of violet-ray machines on the Pacific Coast and in other western states.

Johns-Pratt Company of Hartford, Conn., has removed its New York office from 41 East 42nd Street to Room 610, 20 Vesey Street.

Sandoval Sales Company, San Francisco, distributors of Wesix electric air and water heaters, has opened a branch office at 4536 Hollywood Boulevard, Los Angeles, from which it will handle the sale of Wesix products in southern California, Arizona and New Mexico. C. B. Merrick, formerly sales engineer, San Joaquin Light & Power Corporation, Fresno, Calif., has been made district manager.

I. S. Cohen Sons, formerly located at 1015 Market Street, San Francisco, has moved to a 3-story and basement building at 1023 Market Street, that city.

C. F. Bulotti Machinery Company, San Francisco, has moved to enlarged quarters at 829-831 Folsom Street. The firm handles machine tools and railroad supplies.

Appleton Electric Company, Chicago, has established a new office at 71 Columbia Street, Seattle, in charge of C. H. Shoemaker.

Cecil R. Lambert Company, Detroit, has issued a brochure on conveyor applications, which it is claimed should be of interest to every executive who wishes to lower his material handling costs.

The Automatic Transportation Company, Inc., Buffalo, has developed a new lamp known as the Helen Carr lamp, which it is claimed is unique and practical, being a combined lamp and clock of attractive construction.

Delta-Star Electric Company, Chicago, has issued a new publication devoted to high-tension bus supports. There are 48 pages and 119 illustrations. Detailed dimensions of supports up to and including 120 kv. are given.

General Electric Company, Schenectady, recently has issued a pamphlet containing instructions for installing and operating metering outfits. The book also contains diagrams and illustrations.

Servel Corporation, New York City, has taken over the nineteenth floor at 51 East 42nd Street, in addition to the space occupied at 17 East 42nd Street, which will be given over to the mechanical and production departments of advertising and sales promotion in electrical refrigeration.

Edison Electric Appliance Company, Inc., Chicago, has produced a new 6-lb. laundry iron equipped with the Hotpoint sheath wire unit which the company claims is the most serviceable laundry iron built and heats up more rapidly than the ordinary iron.

The Crocker-Wheeler Company, Ampere, N. J., has announced a change in its name. The company is to be known as The Crocker-Wheeler Electric Manufacturing Company.

O. Zernickow Company, New York City, has issued a new circular of its O-Z Laboratory timer stop watch, which it is claimed embodies important improvements in design.

Electric Railway Improvement Company, Cleveland, has issued recently circular No. 12, entitled Electric Weld Rail Bonds. Circular No. 14, another recent issue, covers its portable arc welding outfit for mine service.

Chicago Fuse Manufacturing Company, Chicago, has issued an eight-page pamphlet describing and listing the ferrule contact and knife-blade contact "Union" renewable fuses.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has issued recently a bulletin covering a new line of automatic percolators and describing the application of the disc-type thermostat to percolators.

The Automatic Transportation Company, Inc., Buffalo, has issued a folder which illustrates and describes the advantages of the company's electric heater in its improved design.

Pittsburgh Transformer Company, Pittsburgh, has issued bulletin No. 2048, which contains in condensed form the test and connection diagrams that were published originally in its larger bulletin under No. 2045. This smaller bulletin contains much valuable information which should be of benefit to engineers and operating men and is published in a convenient pocket form.



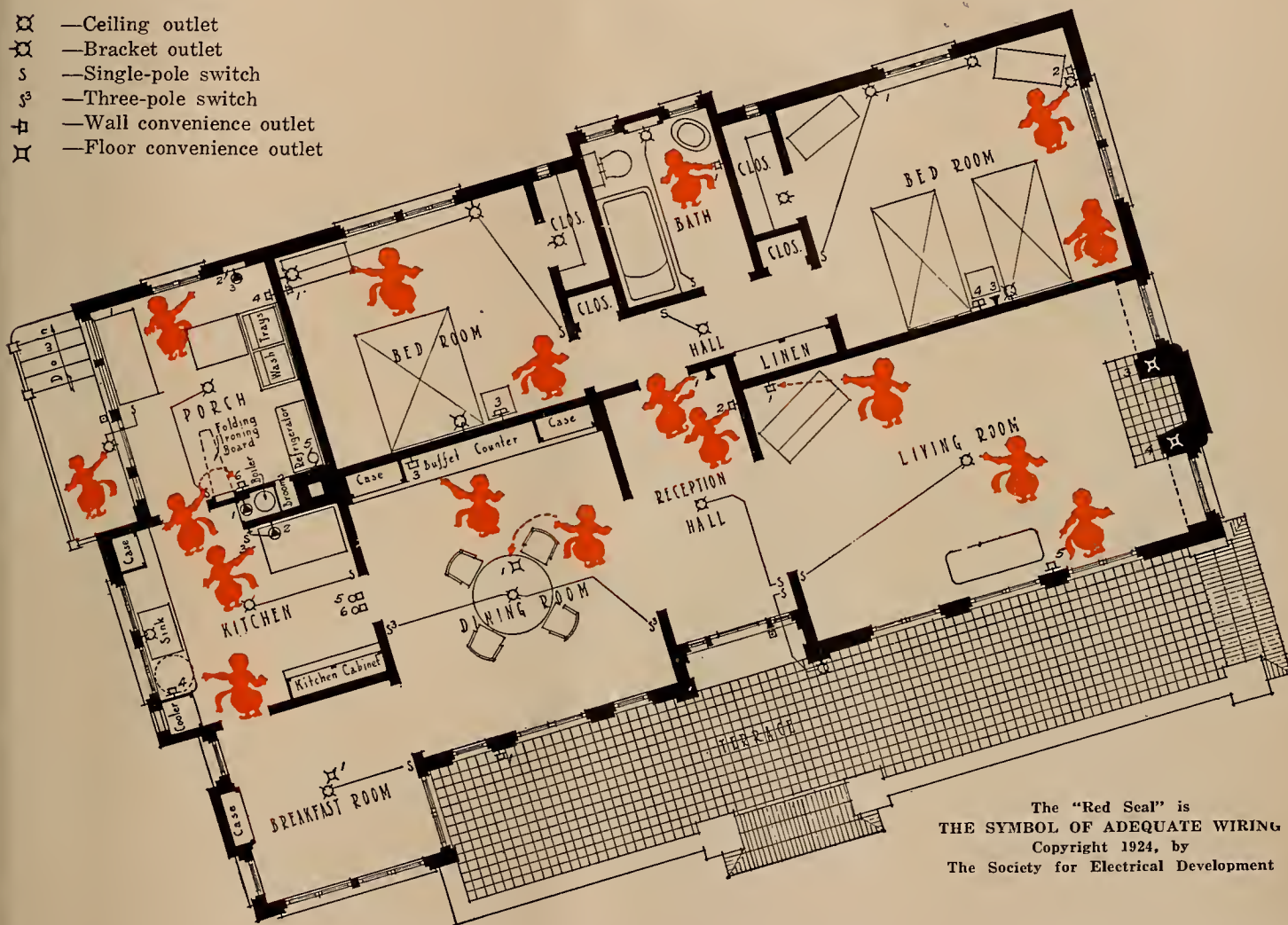
Some of the members of the advisory board of the Electrical League of Denver "warming up" just prior to the Laughing Contest featured exclusively for them at the League's fifth annual picnic. As will be noted, two of the members were "going good" when the picture was taken. These personages were none other than W. R. Kaffer, chairman of the afternoon sports committee, and A. C. Cornell, chairman of the League, who can be identified only by his height and white trousers. Those standing in line, left to right, are: O. L. Mackell, John J. Cooper, Ernest P. Kipp, E. C. Headrick, A. E. Bacon, F. F. McCammon, W. R. Kaffer, K. L. Francis, A. C. Cornell, D. D. Sturgeon, S. W. Bishop, manager of the League; L. M. Cargo, V. N. Garretson, and W. A. J. Guscott. McCammon's Scotch brays are said to have put him in a class by himself in qualifying for the prize.

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

SYMBOLS

- ⊗ — Ceiling outlet
- ⊠ — Bracket outlet
- S — Single-pole switch
- S³ — Three-pole switch
- ⊣ — Wall convenience outlet
- ⊢ — Floor convenience outlet



The "Red Seal" is
THE SYMBOL OF ADEQUATE WIRING
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The Genii of the "Red Seal" Points the Way to MORE PROFITS for you

Neither Strategy, Exaggeration, nor the appeal of Novelty enter into the Red Seal Plan. It is a straight selling program—WITH A WHALE OF A SALES PUNCH BEHIND IT.

And if there is any man in the electrical industry who says that the Plan does not interest him, does not hold for him a definite assurance of more profits, that man does not fully understand the Plan and does not appreciate its scope.

Already, before public announcement

of the Plan has been made, Architects, Builders and Realtors are pressing the California Electrical Bureau for detailed information. Its eager acceptance is assured.

It will be launched as the electrical industry's contribution to the art of real home-building; yet it will be a contribution which will pay big dividends to the electrical industry.

You cannot afford to be indifferent or uninformed. Get the details NOW.



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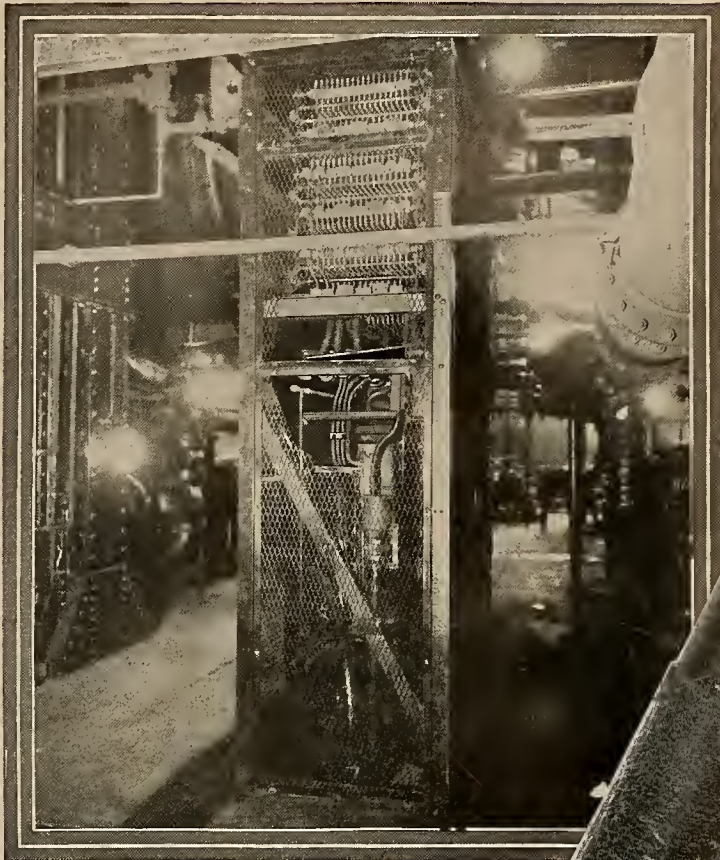
Fresno

Los Angeles



ROCKBESTOS

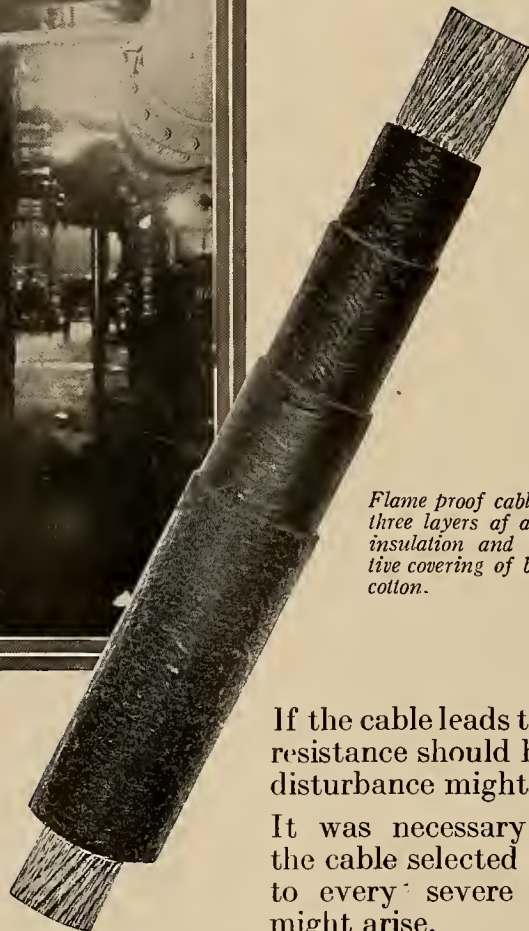
-the asbestos covered wire



*Hudson Ave. Station of the
Brooklyn Edison Co.
Rockbestos Flame Proof Cable
used on this Secondary
Resistance.*

*Magnet Wire
Fixture Wire
Stove Wire
Heating Elements
Heater Cord*

*Rockbestos Insulation
is put to a severe
test!*



*Flame proof cable with
three layers of asbestos
insulation and protec-
tive covering of braided
cotton.*

If the cable leads to this secondary resistance should burn out serious disturbance might follow.

It was necessary therefore that the cable selected should be equal to every severe condition that might arise.

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ELECTRICAL EQUIPMENT AND CONSTRUCTION MATERIALS

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LOS ANGELES



Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."
Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication
Published Semi-Monthly
Established 1887

G. R. HENNINGER, Associate Editor
R. N. PHELAN, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

W. A. CYR, Associate Editor
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VOLUME 55

SAN FRANCISCO, NOVEMBER 15, 1925

NUMBER 10

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McGraw-Hill Company of California — 883 Mission St. — SAN FRANCISCO
Northwest Office: 1206 Spalding Building, Portland, Ore.
Publishers of JOURNAL OF ELECTRICITY

JAMES H. MCGRAW
PRESIDENT

C. T. HUTCHINSON
VICE-PRES. & GEN. MGR.

J. W. OTTERSON
SECRETARY & TREASURER

WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

McGraw-Hill Purchases EMF Year Book

THE EMF Electrical Year Book has been purchased by the McGraw-Hill Company from the Electrical Trade Publishing Company. This important trade directory has grown rapidly during the four years of its existence until today it occupies a prominent place in the publications of the electrical industry.

Its purpose is to give accurate and concise information about the rapidly growing electrical industry. With the countless changes taking place in this new industry each year there has grown up an insistent need for a publication that would function as a complete and unbiased trade directory of all electrical products, their manufacturers, trade names and other essential trade information. The EMF Electrical Year Book adequately fills this need. It is a complete trade directory of the industry describing every manufactured product and listing every manufacturer thereof.

The EMF Electrical Year Book will be added to the McGraw-Hill electrical unit which now comprises Electrical World, Journal of Electricity, Electrical Merchandising, Industrial Engineer, Radio Retailing, Radio Trade Directory and the McGraw Central Station Directory. This latest addition to its publications marks another step by the McGraw-Hill Company to broaden its service to the electrical industry.

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Publishers of

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(Published in London)

Industrial Engineer (Published in Chicago)

Electrical Merchandising

Chemical and Metallurgical Engineering

American Machinist

Electrical World Electric Railway Journal

Engineering and Mining Journal-Press

Bus Transportation

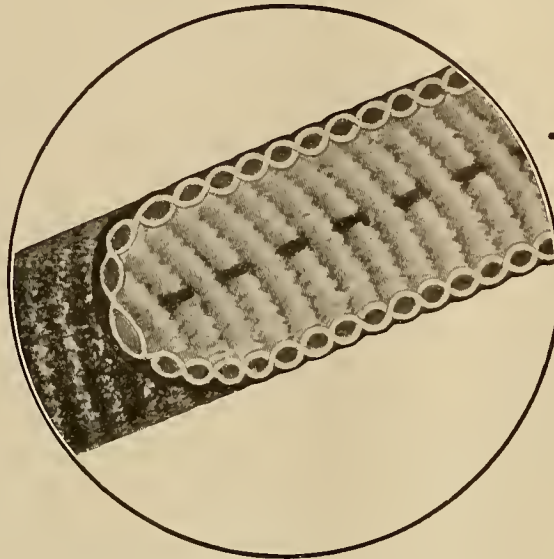
Engineering News-Record

Coal Age

Radio Retailing

Power

Why we put Roller Bearings in Duraduct



You know what a difference there is between hauling a load along a flat surface and rolling it over roller bearings. It's the same way fishing wire through loom. Ordinary loom has a flat surface in the tube. When you fish a wire through it the friction causes the waxed braid on the wire to slip back, bunch up and clog the tube. But DURADUCT is different! Its wireway is just one continuous chain of roller bearings. That is why DURADUCT is faster fishing. Wire just hits the high spots on the roller bearing wireway. There's no trouble fishing long lengths through DURADUCT. Fifty feet fishes as easily as five.

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EDITORIAL

"Busy Buttons" As a Humanizing Agent

TRANSLATIONS of the so-called mysteries of electric production and utility operation for the benefit of laymen have been numerous and their methods of approach of the subject have been varied. Yet none, surely, have been handled so charmingly as that of the Southern California Edison Company through its creation of that happy little representation of itself, "Busy Buttons."

Nearly all descriptions of utility methods of operation, financing, and policy have been attempted from a serious side. And though they often have been exceedingly well written and rendered understandable to the layman of even little learning and limited intelligence, they have been perhaps too formal in presentation to invite a thorough reading.

There never can be any accurate means of gaging beforehand just how many people will read and digest any given piece of literature. But certainly that piece of literature which engages one's interest, touching a human note of response, and promises to amuse as well as enlighten will enjoy a greater percentage of possible readers than one less appealing.

In the face of misunderstandings fostered by that type of political enthusiast who would capitalize on such misunderstandings, the electrical industry has been seeking some means whereby it might interpret itself to the public in terms that the public could understand, for, generally speaking, electrical development is a technical and complicated process. It has felt, too, that a humanizing of itself might contribute to more mutually satisfactory relationships between public and industry. Just what method should be employed to accomplish this humanizing, however, has been in question.

In "Busy Buttons" a courageous effort to establish that company upon a plane of complete visibility of its working processes is being made. Rate theory, financing, return on investment, and technical details concerning the physical properties and their expansion are stripped of their high-sounding qualities, taken from the artificially aloof shelf upon which the public places them, and brought down for scrutiny, to be seen simply as what they are and how necessary they are. The taxation situation is explained in words of one syllable, and a strong point is made of the fact that privately owned utilities, regulated by the California Railroad Commission, equalize their rates so that the farmer in the sparsely settled regions may enjoy the same service at the same cost as his more

fortunate neighbor in the city where distribution is relatively less costly. The advantage of this economic situation, both to farmer and to city man, are also vividly impressed.

Altogether, because it probably will enjoy a much more widespread reading by the customers of the company issuing it, as much as because the matter in it is attractively handled, both as to illustration and text, the introduction of "Busy Buttons" into the industry will prove interesting to watch and see develop.

Industrial Lighting Activity Merits Fullest Attention of Industry

LIKE the Home Lighting Contest the work of the Industrial Lighting Committee of the N.E.L.A. has public service as its primary object, but with one exception. Where the activity of the Lighting Educational Committee was divorced entirely from commercialism, with its benefits more or less intangible, the industrial lighting activity has frankly a commercial purpose. In the earlier movement the entire industry was asked to take an unselfish attitude toward the educational work with the assumption that bread cast upon the waters ultimately would be returned with profit. In the case of the industrial lighting work no such restraint is suggested nor is any intended. The result will be a greater appreciation of the profitable aspects of better lighting in the factory, with an immediate and simultaneous profit for the electrical contractor, the central-station companies and the fixture manufacturers.

Its success reduces itself to the question: Do those on whom the movement depends desire to exchange some definite merchandising energy for a substantial and immediate profit?

The industrial lighting activity is a merchandising movement. It is based upon the fact that better lighting will insure greater factory efficiency, reduce accidents, prevent waste and improve the morale of workmen. If this idea is sold the inevitable result will be an order for an installation. The work must be done with profit, both to the electrical contractor and the fixture manufacturer. The central station will benefit from the increased sale of current. Locally, then, it translates itself into a simple and easily understood merchandising campaign.

On the Pacific Coast and in the Mountain states there are factories that are poorly lighted. The Industrial Lighting Committee has paved the way for the electrical industry locally by the publication of a series of national advertisements designed to

create an initial interest in better lighting. It has gone further. It has prepared booklets, pamphlets and sales material, together with an outline for local campaigns. The rest lies with the industry itself in the individual cities. Let the West put its shoulder to the wheel in this movement and take its fair share of the profits.

Santa Claus on the Job Again

WHEN our forefathers were boys Santa Claus had a poor load factor, for Christmas shopping started Dec. 24. Modern merchandising science is improving this situation, and in 1925 Santa Claus showed up in the majority of cities on Nov. 1 with his overalls on and punched the time clock in anticipation of the biggest volume of Christmas business in history. All of which is meant to serve as a timely warning to the electrical industry to start its Christmas merchandising season early.

Considerable space is devoted in this issue to a discussion of Christmas merchandising plans as developed by dealers and others last year. Of chief importance in the material presented, however, is a description of the plan adopted in Denver to make that place the "Christmas City of the World." Now word comes from Denver that the plan of giving prizes for outdoor home Christmas displays is to be extended to all communities in that section of the state. Judged on the basis of the success achieved last year, Christmas-tree lighting sets will be at a premium in that district again in 1926. Other cities in the country might do well to study the plan in effect in Denver and adopt it to their own needs. Certainly it is one way of bringing the electrical industry to the attention of the Christmas shopper.

Public Relations Appeal Commences Early

A WORTH-while work is being undertaken by the Committee on Co-operation with Educational Institutions of the Public Relations Section of the Northwest Electric Light and Power Association. This work consists in arranging for speakers from the ranks of the light and power companies to deliver talks on different phases of the utility business before students in electrical engineering and in business courses in the universities of the territory. It is understood that individuals in several companies have volunteered their services in this work, and as is indicated by the reported results of a recent meeting of the committee with professors and department heads of the Washington State College, Pullman, and the University of Idaho, Moscow, arrangements have been made with these institutions to try out a tentative program of speeches on a variety of subjects in a number of the classes during the balance of the current college year.

This, it seems, is an admirable adjunct to the public relations programs of the utility companies of the Northwest. To get a few facts about the business before a number of future customers and possible employees, while those young people are in a receptive mood for the absorption of such facts;

to supplement the theory taught in the business courses by facts from actual experience, presented by men successful in their chosen callings, from the firing line, so to speak, of business—these aims constitute an excellent method of getting part of the electrical story before an important portion of the public that should be beneficial both to the cause of the utility companies in general and to the students as well.

Research and the University

RESEARCH is the foundation of scientific advancement. Efficiency and economy in research activities are attributes as valuable there as in fields of more commonly understood endeavor. Concentration of equipment, material, brains and funds tends to greater achievements and centralization of control. Such is the present-day tendency, and, while neither belittling nor decrying these efforts, a warning thought is timely.

Continuity of research depends primarily upon the continuity of supply of men of research ability. Opinions differ as to whether men must be born with this peculiar ability or whether it may be created by educational effort. Regardless of the differences of opinion in respect to the process of evolution of a research worker, whether it be the natural growth of inborn genius or the development of latent ability, education is the process which produces the desired result. This means simply that upon institutions of collegiate rank rests the responsibility of supplying the man-power without which a research organization becomes nothing.

To train properly men of research ability, or men of ordinary technical ability for that matter, our collegiate institutions must have research equipment; they must have funds with which to do research work; they must have an active hand in the solution of at least a portion of contemporary research problems; and they must have the full co-operation of the industrial organizations for which they are building men. Without this support the educational institution must labor under limitations which curtail its research activities and consequently curtail seriously its production of trained man-power which is the first requisite of successful research. Therefore, while perfecting the important centralized research organization, forget not the university.

A Coincidence or What Will You?

ON or about Nov. 21 next all roads in California lead not to Rome but to San Francisco. There may be those within the industry who will urge that the sole reason for this focussing of attention upon California's central metropolis is due to the fact that so many electrical organizations have selected perhaps not this exact date but dates thereabouts for holding their fall meetings.

The Executive Committee of the Pacific Coast Electrical Association, for instance, meets on Fri-

day, the 20th; the entire Commercial Section of this same useful organization will hold its fall meeting on the 19th and 20th; then there is the California Electrical Bureau which will meet on Monday, the 23d. Of course since there is a certain amount of duplication in the membership of these various organizations, non-conflicting dates are necessary in the interests of a good attendance and efficiency in operation.

It is strange perhaps that Saturday, Nov. 21, and the opportunities offered by this date have been overlooked as a possible time of meeting to discuss the many abstruse problems with which the industry is confronted. However, Saturday of course is an off day. It is difficult to get much done on Saturday morning because Saturday is a half-holiday; therefore, why bother with Saturday morning at all? Is it not better really for all concerned to take advantage of the long arm of coincidence and attend the annual Pacific Coast football classic at Stanford Bowl which offers a welcome relaxation from the arduous duties of protracted business sessions to all of those who are so fortunate as to have been able to obtain tickets?

Another

Forward Step

METERMEN are valuable units of the electric service company's organization. It is upon these men that the company and the customers are dependent for the fair, accurate and infallible measurement of the power which one produces and the other uses. The duties of the members of the meter departments are peculiar and highly specialized. Metering and power measurement are strictly the work of those who have specialized in the work, and it is practically impossible to get properly trained men outside of the ranks of the utilities themselves.

Education of metermen is one of the most important subjects occupying the time and effort of the meter committee of the P.C.E.A. Definite courses are planned. Much hard work faces the subcommittee handling this particular subject. Some prejudice and much inertia must be overcome; executive support must be won by a barrage of indisputable facts and figures; co-operation of educational institutions of standing must be inspired; metermen and recruits alike must be shown that study and constant effort is the prepaid price of satisfaction, success and achievement. The results of consistent and regular "meter short courses" will be increased economy and efficiency in this important field.

Commercial Refrigeration as a Load-Building Field

INTEREST in electric refrigeration as a load-builder for the central stations is growing at a rapid rate. A recent study of commercial electric refrigeration on the part of one of the leading central stations in California brought out many interesting features that seem worthy of repetition. This investigator pointed out that commercial electric refrigerators should be used in preference to

any other type of refrigeration because they gave better displays which resulted in additional profits and increased patronage, were economical as to operation costs by reason of the marked reduction in food loss, and were cleanly, convenient and healthful. What more could be said than this?

The field of application seems almost unlimited. Some of the major uses include ice-cream cabinets, soda fountains, water coolers, soft-drink coolers, dairy cabinets, meat markets, flower shops, grocery stores, candy shops, drug stores, cafeterias, and many others.

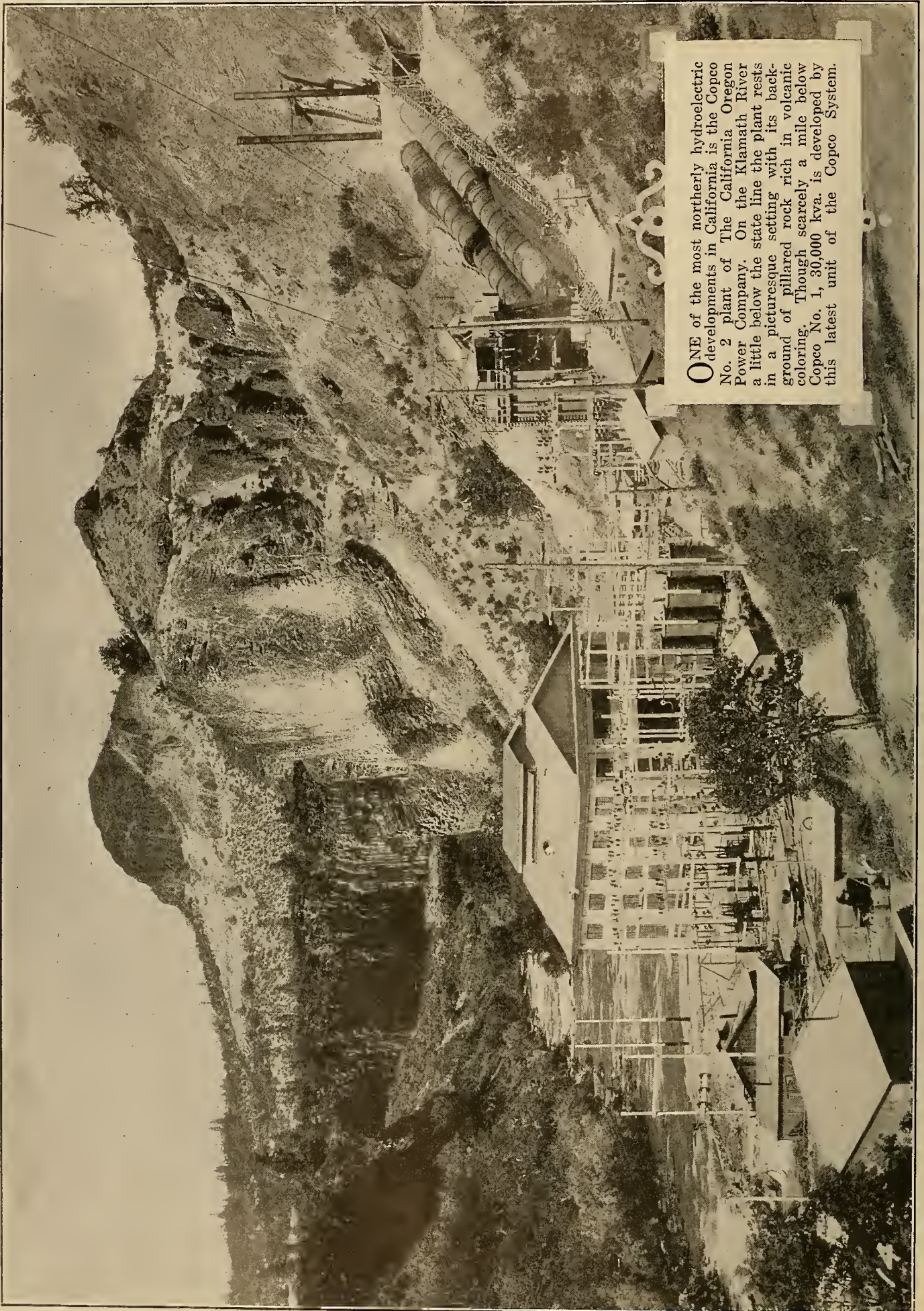
Here is an ideal set-up in which the power companies have the power plus a large sales organization engaged in pushing the application of load-building appliances. The commercial refrigeration companies have a product which has been tried and demonstrated to be sound, a well organized sales force and a financial backing to insure responsibility and service. The refrigerator offers a particularly valuable load-building appliance as it has a high load factor and requires no additional wiring, transformer capacity, meter readers, collectors or bill clerks. While no definite announcements have been made, it is believed that the sales programs of the Western central stations cannot do other than give careful consideration to electric commercial refrigeration in their load-building campaigns.

Advertising and the Utility Business

NOT the least important of the reasons for the low cost of electricity today is the power of advertising, according to a writer in a recent copy of "Printers' Ink." He ascribes the fact that the public is paying 10 per cent less for electricity and 73 per cent more for food, clothing and shelter than in 1913 to the direct and indirect effect of utility advertising. According to the writer, advertising has worked in three ways to absorb constantly increasing production cost and at the same time sell service for less money. In the first place, it has increased the volume of consumption to a point that made possible mass production and distribution with its attendant benefits. Then it has cut in half the cost of financing the extensions and improvements necessary to meet the constantly increasing demands for service. Finally increased prices for labor, coal and materials have been offset by economies in production brought about by mass selling.

There are still to be found among public utility executives men who believe that advertising is unnecessary because their business is a monopoly. For their benefit, we add to the arguments presented by the above writer a statement recently made by W. H. Hodge, advertising manager of the Byllesby companies and former chairman of the public utilities advertising department of the National Advertising Association:

"It is now generally recognized that there is no more possibility of making a success out of the utility business in this age minus expert advertising than there is in trying to get along without good engineers, capable accountants and auditors, salesmen and trained workers."



ONE of the most northerly hydroelectric developments in California is the Copco No. 2 plant of The California Oregon Power Company. On the Klamath River a little below the state line the plant rests in a picturesque setting with its background of pillared rock rich in volcanic coloring. Though scarcely a mile below Copco No. 1, 30,000 kva. is developed by this latest unit of the Copco System.

Klamath River Plant Completed by The California Oregon Power Company

COPCO No. 2 is the third of a series of hydroelectric plants recently constructed by The California Oregon Power Company, and the second unit of a series of developments made and to be made on the Klamath River in northern California and southern Oregon. The territory served by that company comprises a 300-mile stretch from the Sacramento River canyon in northern California to the Willamette Valley in central Oregon. This country is a progressive and potentially rich agricultural, mining and dairying district. Natural growth of demand, pioneer work on the part of the company in extending electric service to the rural communities, and foresight in preparing to meet future power demands is prompting a logical development of the hydroelectric possibilities as they become economically feasible.

Heading in the Upper and Lower Klamath Lakes, the hydraulic characteristics of the Klamath River are such that appreciable storage for any of the individual plants is not necessary. Hence the Copco plants are primarily stream-flow plants. Copco No. 1 has a forebay storage of some 10,000 acre-ft. for purposes of regulation and in this capacity also serves Copco No. 2, about a mile downstream, making of the two almost a hydraulic unit. A third and smaller and older plant in the Copco group is the Fall Creek plant. Copco No. 1 has a capacity of 25,000 kva. under a head of 125 ft.; Fall Creek, 2,750 kva. under a head of 730 ft., and Copco No. 2, 30,000 kva. under a normal operating head of 140 ft. These three plants are electrically interconnected by 66-kv. lines. Copco No. 2 was dedicated just a year and two days after work started on the project.

Dam

Several possible dam sites below Copco No. 1 were prospected before the final and actual location was selected. One apparently promising site would have utilized a structure some 125 ft. high and 500 ft. or so across the crest. This would have provided a forebay storage of several thousand acre-ft. and necessitated a tunnel of only some 800 ft. or so in length to the present power-house site. However, several factors entered into the abandonment of this and other possibilities for the present site. Construction costs per foot of developed head would have been increased appreciably. While rock was

ONE of the latest hydroelectric generating plants in the Western states is Copco No. 2 on the system of The California Oregon Power Company. This 30,000-kva. development has many novel features, one of which is the largest wood pipe line in the country. This article describes the project in detail.

available for abutments and foundations on the surface, the rock structure was not continuous and was underlaid with volcanic material of questionable mechanical and hydraulic characteristics. Therefore, after careful consideration of the data collected by the various surveys, it was decided to build the smallest dam possible for purely diversion purposes and to build the necessary conduit to the plant site.

The dam is, therefore, a gravity-section structure of reinforced concrete. This net spill crest length is 130 ft. and height above the original stream bed 34 ft. The object of this dam is to divert a portion of the stream into the power tunnel. The location is about 1,000 ft. downstream from Copco No. 1. Water is backed up clear into the tailrace of the upper plant, thus no usable head is lost. The thickness of the dam at its base is 31 ft., and the flow surface of the spillway is a smooth parabolic curve.

Four heavily reinforced concrete piers divide the spill crest into five equal divisions. Each of these sections is 26 ft. wide, 22 ft. 6 in. deep and capable of passing between 5,000 and 6,000 sec.-ft. Each of these openings is controlled by a 11 x 26-ft. Tainter radial gate. Several different types of gates were considered and the final selection made on the basis of initial and operating economy. There are two gate-operating mechanisms, each kept normally connected to a gate, but either may be moved to an adjacent gate when the occasion requires. These mechanisms are equipped with a 5-hp. motor, and one of them is wired to remote control from Power House 1 and the other from Power House 2. In this way each power house has some degree of control over the water elevation. Furthermore, two gates are more than sufficient to pass the maximum flood that has been recorded to date. The two operating machines for the gates travel on a narrow-gage track carried on a bridge surmounting the aforementioned piers and provided for the purpose.

Test drillings on the dam site showed that the only solid rock in the immediate vicinity was a lava flow which came down at an angle from the hill at the northern end of the dam and continued at a slope under the dam itself. However, the depth of these strata is such that it was impracticable to carry the body of the dam down to them except at the northern end where the rock was closest to the surface. Elsewhere the dam structure is car-

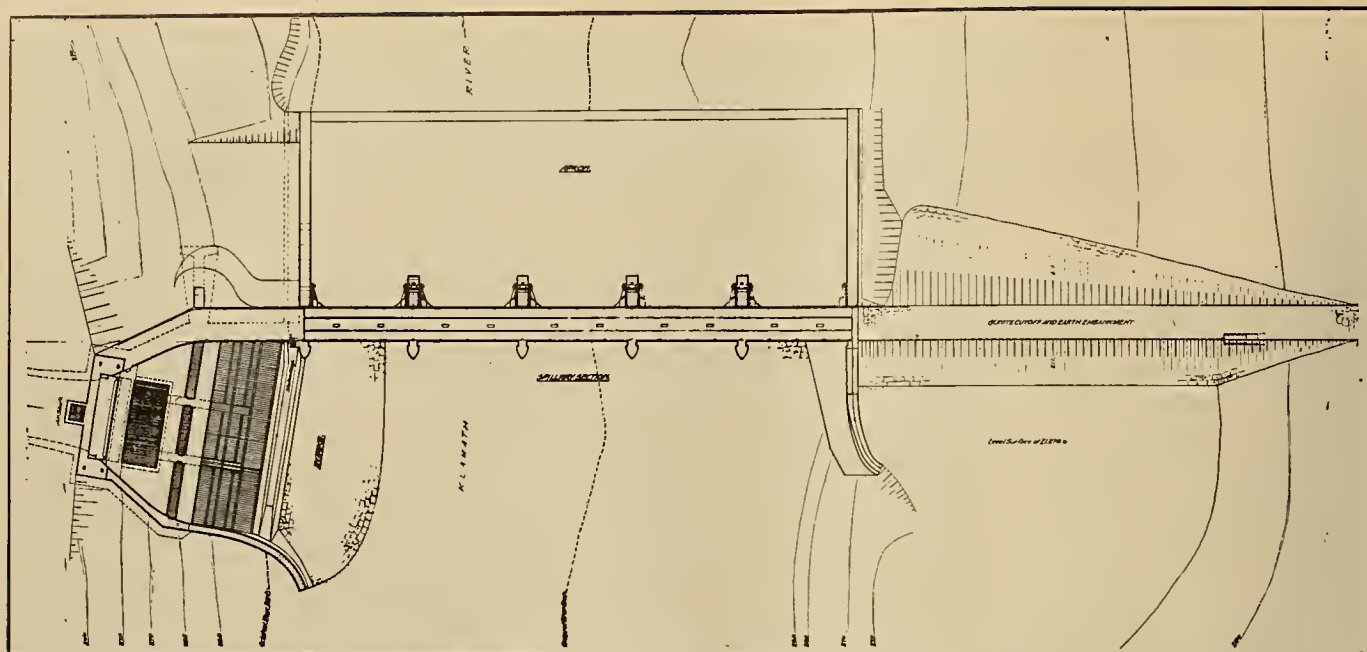


Fig. 1—Plan view of diversion dam and intake structure.

ried on a boulder-and-gravel combination intermixed with some cinders and some clay.

To make this mixture impervious to the passage of water a grouting ledge was provided at the heel of the dam, and the entire distance between the top of the rock strata and the bottom of the dam and intake structure was grouted solid. Further, this

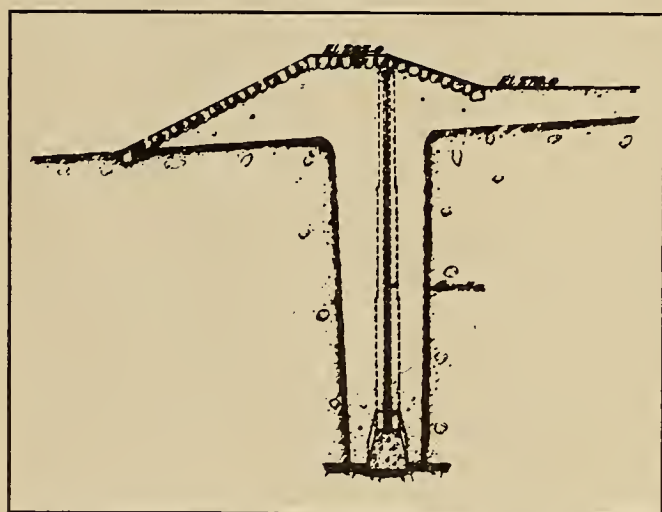


Fig. 2—Sectional view of Gunite cut-off wall and earth fill.

grouted mass was interlocked with the rock strata by drilling these rows of grout holes into the rock itself. At the northern end of the dam the volcanic rock layer was topped with a strata of cinders among other things that extended back into the hill and in which the water flow was excessive. At this end of the dam an earth-fill, riprapped-faced continuation of the main dam was constructed. As additional insurance a double welded-wire-mesh, Gunite-filled core wall was constructed at the center of the fill. As further precaution against excessive leakage this cut-off wall was extended into the hill, cutting off the cinder strata, for a horizontal distance of about 100 ft. Like the grouted section under the dam, this cut-off wall was seated

on the rock strata and carried up to an elevation corresponding to the top of the bridge deck over the dam. Fig. 2 shows a typical cross-section of this construction.

The method of placing this Gunite cut-off wall was simple. Two standard-width strips of 3 x 3-in. Clinton welded-metal mesh were set up 2 in. apart and supported by a board wall which constituted a one-sided form. Concrete aggregate then was shot into the mesh by the Gunite process and the wall allowed to set for 12 hr. After this period of time the wall was back-filled on both sides to an elevation which permitted another section to be erected above the first.

As shown in Fig. 3, a 29-ft. apron is provided below the ogee section. Further it may be seen that there is erected at the end of the apron a 3-ft. baffle wall which is really a continuation of the lower cut-off wall. The object of this wall is to absorb the energy of water which may be spilling over the dam. Many experiments on a model were carried on with various types and locations of

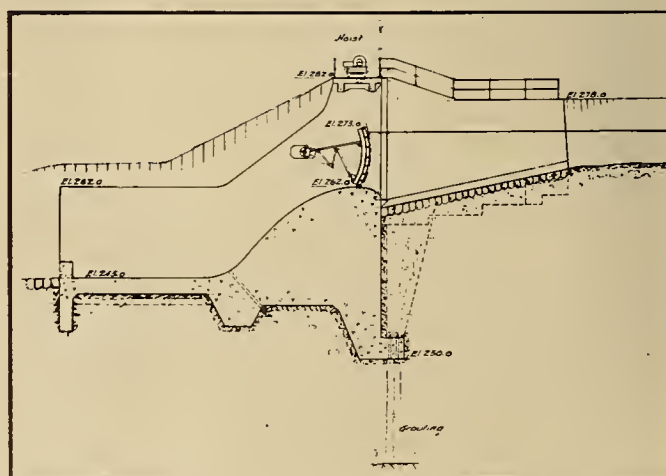


Fig. 3—Cross-section of diversion dam foundation, grouted cut-off wall, baffle wall, north curtain wall, gates and operating mechanisms.

walls, piers and depressions before the design finally was decided upon. Results of tests showed that for the particular job in hand the plain baffle wall at the end of the apron was the most economical.

Intake Structure

At the southern end of the dam and practically a part of it is the intake structure. It is of reinforced concrete and monolithically joined to the tunnel of which it is the portal. A trash rack 48 ft. wide and 32 ft. high serves to bar what little debris may collect in the forebay from entering the tunnel. No provision is made for rack cleaners because of the relatively short distance of open flow from the upper power house where all river debris is removed above the main dam.

Back of the trash rack the section tapers to a 19 x 20-ft. rectangle. At this point a single Philips & Davis caterpillar gate, 19 x 20 ft. in size, is installed. The operation of this gate is such as to obtain maximum water seal with minimum friction to be overcome by the operating mechanism. Of course, the plane of the gate face and that of the seat are parallel. However, the plane of gate motion is vertical while that of gate face and seat is at a slight angle, tilted toward the tunnel at the top. The gate itself is fitted with a caterpillar tread which carries all of the water pressure except for the last fraction of gate travel as it is seating. For this distance the gate slides on the seat. This gate is provided for purely emergency occasions when it may be desirable to drain the tunnel. It is arranged for remote operation from Copco No. 2 for closing only. No gates or valves are installed at the head of the penstock lines.

The operating machinery for the gate is carried on a structural-steel framework over the intake structure. On top of the tunnel and extending back a distance of 58 ft. from the intake to the hill is a Gunite cut-off wall. Just inside of the gate a vent is provided in the roof of the tunnel and carried to a point above high-water level.

Tunnels

Between the penstock pipes and the intake structure are two lengths of tunnel and one of wood-stave pipe. The upper tunnel is 2,440 ft. long and has a grade of 7.83 ft. per 1,000. The geologic structure through which this tunnel was driven necessitated timbering for construction purposes and full reinforcing of the concrete lining for about 70 per cent of its length. A typical tunnel cross-section is shown in Fig. 4, which shows lining methods for both timbered and solid-rock sections. An equivalent diameter of 16 ft. prevails throughout the entire tunnel with the exception of the 105 ft. between the surge chamber and the manifold.

The lower tunnel was driven through solid rock for all but about 180 ft. of the total 1,105-ft. length. This lower tunnel has a grade of $4\frac{1}{2}$ ft. per 1,000. Total tunnel excavation was about 54,000 cu. yd. The reinforced concrete lining accounted for the use of some 12,700 cu. yd. of concrete and 422 tons of reinforcing steel. All but 80 tons of the latter was used in the upper tunnel.

Wood-Stave Pipe

Connecting the two tunnels is 1,318 ft. of 16-ft. inside diameter wood-stave pipe erected by the Continental Pipe Manufacturing Company of Seattle. This is the largest pipe of its kind in the United States. The pipe staves are 4 in. thick and of treated Douglas fir. The pipe-line right-of-way encountered nothing more substantial than the usual volcanic mixture, and hence particular attention had to be paid to the footings because of the tremendous loading. Reinforced-concrete footings were designed to transmit a soil pressure of a maximum of 2,500 lb. per sq. ft. On tangent sections these footings were placed on 10-ft. centers and on curved sections were placed on 8-ft. centers. The increased footings on the curved sections were to provide for horizontal thrust. Fabricated-steel cradles are mounted one on each pier to carry the pipe.

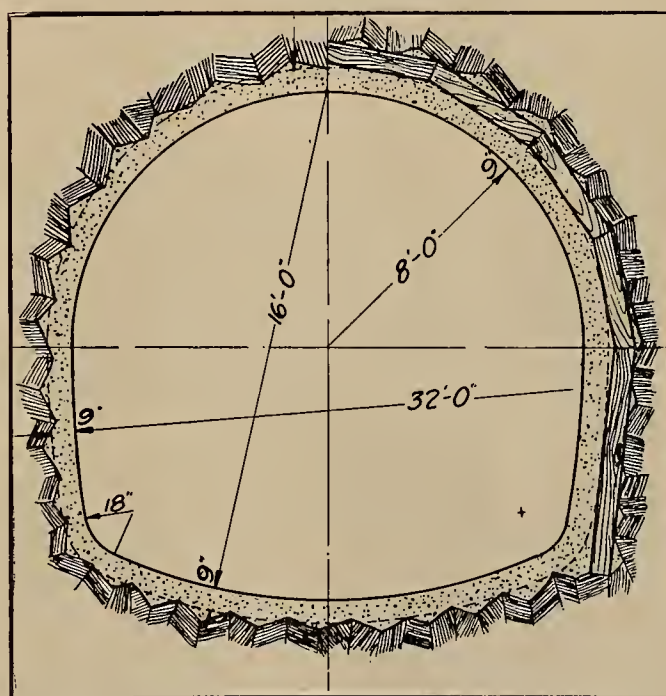


Fig. 4—Typical tunnel section; also shows method of timbering where necessary to timber. Total net area, 216.4 sq. ft.

What excavation was necessary for the pipe line was done with the idea of carrying all footings on original earth. When it is considered that the loading imposed upon the piers by the pipe when filled with water is about twice that for which the ordinary railroad bridge is designed, it is no wonder that 1,000 cu. yd. of concrete and 50 tons of reinforcing steel went into footings alone. The full-pipe loading is about 13,000 lb. per lineal ft. or 130,000 lb. per footing on the tangent sections.

At each end of the wooden pipe, connection is made to the tunnel through a $15\frac{1}{2}$ -ft. section of 9/16-in. steel pipe of the same inside diameter as that of the wooden pipe. At these points the tunnel shape is changed to a circular section to receive the steel-pipe thimble. The thimble is inserted into the tunnel for over half its length and into the wooden pipe for a distance of 3 ft. At each thimble is provided a steel vent pipe which extends high enough to top sufficiently the normal pond level at

the intake. These vents are designed and placed to prevent any collapsing force being imposed upon the wood pipe. The grade of the pipe line is 1.9 ft. per 1,000 and the normal head for which it is designed is 60 ft.

Surge Chamber

Directly over the tunnel and 105 ft. from the penstock portal is a spill-type surge chamber. The bottom of the chamber is 40 ft. in diameter. This section continues vertically for $10\frac{1}{2}$ ft. and then tapers to a throat diameter of 20 ft. The total height is 52 ft., the length of the spill crest 33 ft., and the depth of the spill crest about 16 ft. An open vent shaft about 6 ft. in diameter extends from the top of the cavity through the hill above to atmosphere. From the spill crest the waste water is conveyed some 330 ft. through a 15-ft. horseshoe tunnel to a point where it is spilled down the rocky mountain side. Inasmuch as all of the surge chamber was excavated out of solid rock it was necessary to coat the walls only with a comparatively thin layer of Gunite reinforced with welded-wire fabric. All of the rock from this excavation was used for concrete aggregate, hence it was just as economical and more satisfactory to build the chamber totally within the mountain as to excavate on the outside slope for it.

In the design of this feature of the project there were two major requirements to be satisfied. It was necessary to provide sufficient surge capacity to enable the water flow in the penstocks to be accelerated from 0 to 3,000 sec.-ft. in 2 min. and to decelerate in about 4 sec.

Penstocks

At the surge chamber the tunnel section is changed from horseshoe to circular section and is 19 ft. in diameter. This circular section is distorted gradually until it breaks into two separate circular sections. At this point the two $13\frac{1}{2}$ -ft. penstock pipes enter and are sealed into the heavily reinforced, concrete manifold. These penstocks were supplied by the Western Pipe & Steel Company of San Francisco.

Each pipe is about 400 ft. long and is fabricated from 9/16-in. and 5/8-in. plates, lap-jointed, double-riveted, on longitudinal joints and single-riveted on transverse joints. Just before each pipe enters its turbine scroll case it tapers to $11\frac{1}{2}$ ft. and is fitted with a Joshua Hendy butterfly valve of that diameter. Two main anchor blocks and one "flexible" anchor block serve to support each of the lines. The "flexible" anchor pier is located between the two upper main anchors at a depression bend and is provided to obviate the necessity of an expansion joint at that point. It is arranged with an asphaltum packing which permits sufficient motion to relieve pipe strain.

Bellows-type expansion joints are provided between each of the remaining anchor points. This type of joint is extremely simple and considerably cheaper than the ordinary slip joint. Essentially, it consists of four parts: a sliding joint between the two penstock sections, a peripheral fin or ring plate attached to each penstock section, and a second and

narrower ring plate between the two that are fastened to the pipes. These three are riveted together at the outer periphery and form a circular flange having a V-shaped cross section. The comparatively short pipe sections and the relatively small temperature variation encountered necessitates but little longitudinal tape-up under operating conditions. The most severe strain upon the joints was during the construction period and no faults developed.

Power House

The power-house building, indicated in Fig. 5, is a structural-steel, reinforced-concrete building resting on a reinforced-concrete substructure extending 43 ft. below the generator floor. Built into this substructure are the two hydracones for the turbine units. The substructure is designed to transmit a maximum pressure of 5,000 lb. per sq. ft. to the volcanic conglomerate which underlies the structure.

The building is 52 ft. wide, 60 ft. high and 103 ft. long. The generator room is 37 ft. wide and runs the full length of the building. It is spanned by two 40-ton Niles cranes. The use of the two smaller cranes instead of a single 80-ton crane effected an appreciable economy in spite of the slightly higher cost of the two cranes and the

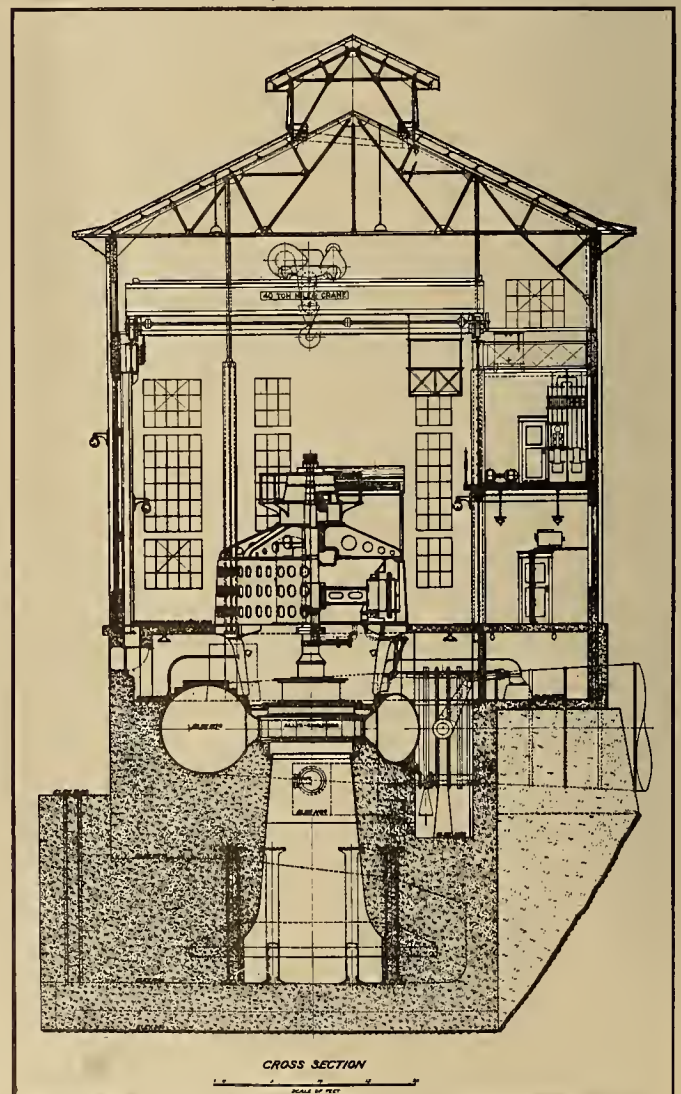
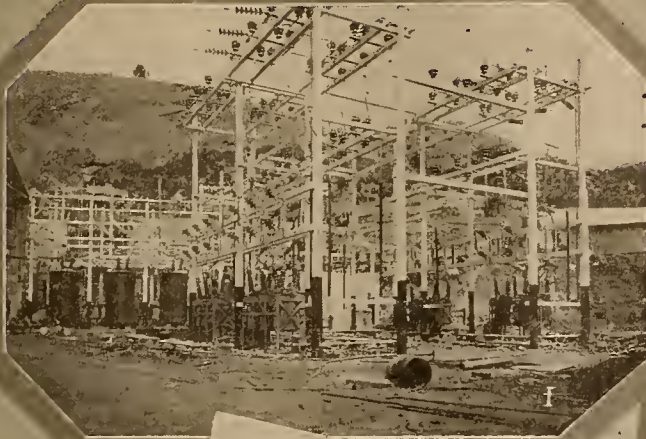


Fig. 5—Transverse cross-section of power house.



OUTGOING 66-kv. lines at Copco 2 are handled from an outdoor wood-pole structure (1). (2) One of the two 15,000-kva. Westinghouse generators; an Allis-Chalmers governor in the foreground. (3) Line 14 looking southward from Copco 2. This line ties the California Oregon system to that of the Pacific Gas and Electric Company at Delta, Calif. The line operates at 110 kv. (4) A glimpse of the 16-ft. wood-stave pipe. This is the largest pipe of its kind in the United States. Its full weight is some 13,000 lb. per linear foot. (5) Five 26-ft. radial gates effect a possible 11-ft. control of head in the forebay. Each gate opening can pass more than 5,000 sec.-ft. (6) Upstream view of diversion dam. Intake structure at left.

equalizer beam over the cost of a single crane. With the two cranes, construction work was speeded up, lighter rail girders were possible and consequently lighter column-and-wall construction followed; building height was reduced several feet; and last but not least, one 40-ton crane suffices for all normal operating conditions except those relatively few occasions upon which it is necessary to lift the entire rotor of a unit. When it is thus necessary to have the combined lifting power of the two cranes it is available through the use of the equalizer beam between them.

At the south end of the generator room the railroad track enters, and space equivalent to that occupied by one generating unit is provided for the convenient handling of equipment.

Extending the full length of the building on the penstock side (Fig. 6) is a 15-ft. gallery upon which is located the station storage battery, station service bus and equipment, main 6.6-kv. bus and generator rheostats. Beneath this gallery and centered between the two units is the main switchboard. Beyond the switchboard at the northern end is a locker room for the operators and at the southern end a storage room and a machine shop.

Generating Equipment

Two 15,000-kva., 0.9 power factor, vertical, 60-cycle, 3-phase, 6.6-kv., 171.5-r.p.m. Westinghouse generators driven by Allis-Chalmers, Francis-type

turbines each rated at 20,000 hp. and designed to operate under a normal head of 140 ft. net, constitute the generating equipment. To each generator shaft is direct-connected a 95-kw., 250-volt, d.c. exciter. Each of these exciters is designed to serve only its respective generator. Consideration of the economies involved persuaded the plant designers not to install a spare exciting set and not to provide reserve capacity in either of the main exciters. Instead it was decided to keep on hand always an extra exciter armature. Thus to replace a defective exciter armature would entail a generator shut-down of only a comparatively short time.

Directly in front of the main switchboard are located the two Allis-Chalmers governors. These governors are the oil-pressure type and are belt-driven from the generator shaft. Governors are arranged for comparatively quick rejection of a load and relatively slow pick-up of load. This is accomplished by a special diaphragm installed in one of the oil lines which permits unimpeded oil flow in one direction, but which regulates the flow in the other direction to a predetermined value.

The location of these devices where they are readily under the eye of the operator assists materially in the concentration of control equipment. With essential apparatus where one man can oversee it without leaving his post near the switchboard it will be possible to operate the station with but

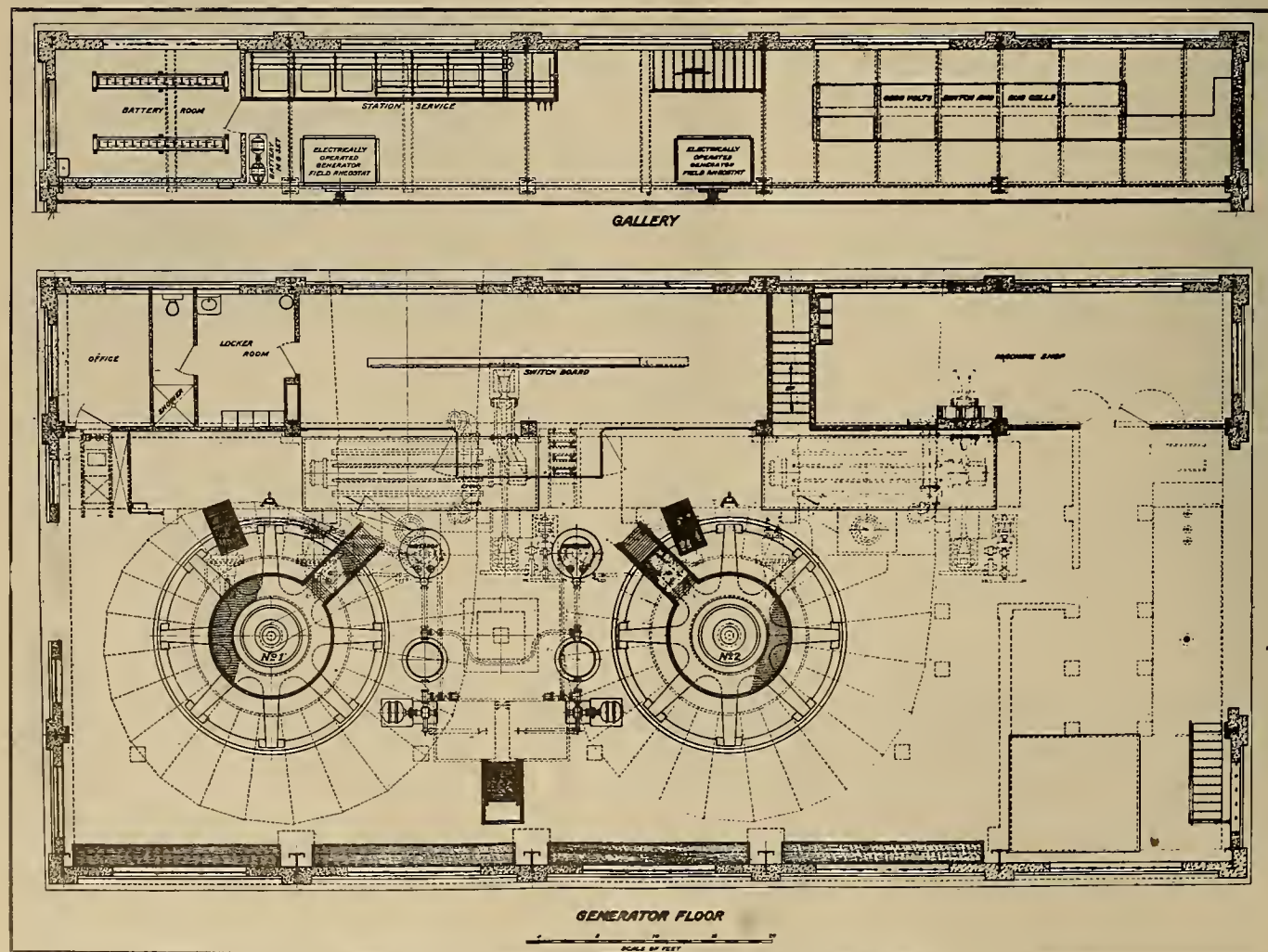


Fig. 6—Plan view of generating floor and gallery.

one man per shift and thus reduce operating expenses.

Further in line with the concentration of equipment is the location of the duplicate Allis-Chalmers oil-pump sets also between the generators but on the opposite side of the room from the switchboard. The size of these pumping sets is such that either is capable of supplying oil for both governors. Interconnection between pumping units permits full and flexible interchange of oil.

Design of the generating units themselves is somewhat special. One main Kingsbury thrust bearing mounted at the top of the unit carries the total rotor load of the entire unit. To conserve head-room in the building there is but one steady-bearing on the generator, the usual lower steady-bearing being omitted. This omission is compensated for by a steady-bearing located at the top of the turbine casing. Further to reduce head-room, to reduce massive concrete foundation construction, and primarily to lend the necessary rigidity to the

be installed to replace the air-break by-pass switch should it become necessary. As noted before, this bus is located on the gallery above the main switch-board. Continuing through the south wall of the building, the 6.6-kv. bus enters the transformer bus structure which is immediately adjacent. This arrangement effects a shortening of low-tension leads. From 3 to 5 copper bars, each $\frac{1}{4} \times 3$ in. and carried on Champion 15-kv. insulators, comprise this bus.

Because of some uncertainty concerning operating necessities of the more or less near future, the transformer bus and the 66-kv. main bus are of wood construction. The transformer bus accommodates a bank of three 20,000-kva. Westinghouse 6.6/66/130-kv. units and one spare unit. The high-tension leads pass to the top of the structure when they take off to an adjacent 110-kv. switch structure and on to the 110-kv. line. The 66-kv. taps on the transformers serve as a tie-in between the 66-kv. and the 110-kv. systems, which come together at this point.

Adjacent to the transformer bus structure is the 66-kv. bus. Here provision is made for double-bus switching of the three outgoing 66-kv. circuits. As indicated in Fig. 7, one oil breaker, two disconnecting switches, one grounding switch and two air-break bus-selector switches comprise the equipment for each circuit. A single bus-tie oil switch is provided but without a by-pass. To by-pass the bus-tie breaker it is necessary to close both of the bus-selectors on any one of the circuits. An automatic oil circuit breaker with suitable disconnecting and by-pass switches is installed in the leads from the 66-kv. taps on the transformers.

Lightning protection is provided in the form of a set of autovalve lightning arresters connected to the bus between the transformers and the outgoing circuits. Other protective features include differential protection on the generators and on the transformer bank. Operation of the generator differential relays opens the generator oil switch, kills the generator field, and operates the governor to shut down the unit. Operation of the transformer differential shuts down both generators and in addition opens the 110-kv. line switch and the 66-kv. bus switch. Over-speed and temperature protection also are provided for the generators and overload protection for the circuits.

Station service is assured through an automatic change-over which cuts in a line from the upper power house in the event of voltage failure at this lower power house.

The generator voltage regulators are Westinghouse extended-broad-range type and designed to give automatic voltage regulation from a field potential of from 4 volts upward to and above normal. For field voltages of less than 60, external resistances automatically are cut into the circuit, maintaining this minimum voltage of 60 on the vibrating regulators. This gives a full power-factor range to care for the peculiar service to which this station is subjected and does it without reversing the exciter. A complete cut-in or cut-out may be made in 11 sec.

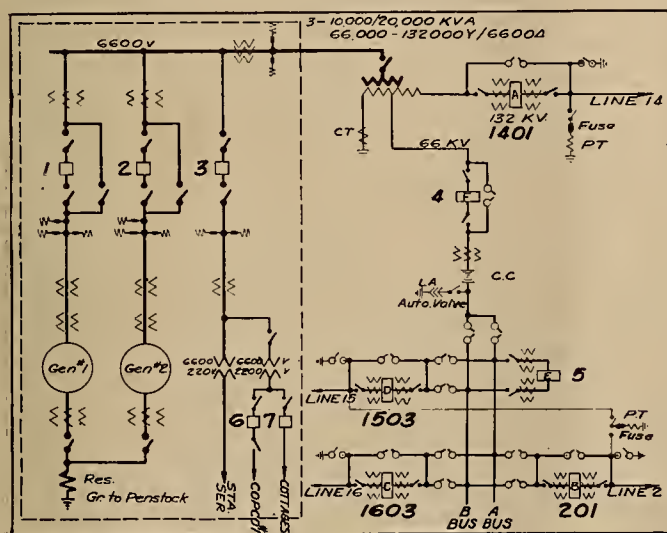


Fig. 7—Single-line wiring diagram of electrical connections.

turbine-generator unit, a cast-steel barrel rests upon the turbine frame and entirely supports the generator as shown in Fig. 5. A net saving of 10 ft. in building height was realized through this feature of design and construction.

Ventilation of the generating unit is accomplished by the draft created by the rotor. The steel supporting barrel in the basement has four openings for the passage of cooling air from the basement into the generator.

For fire-fighting each generator is piped for water flooding and the valves are located within reach of the floor at each generator.

Electrical Arrangements

A single 6.6-kv. generator bus was provided for the reason that with a single bank of transformers there would be no material benefit to be derived from a double bus at this point. Each generator is connected to the bus through suitable oil circuit breakers and disconnecting switches. For clearing an oil breaker there is a by-pass switch for each breaker. Providing for possible future needs, arrangements are such that another oil breaker may

"Busy Buttons"

The Soul of a Corporation Is Discovered as the Soul
of Bright, Cheerful Service

IN a day when it is sometimes said by those who would have one believe it that any given corporation is "soulless," it is a refreshing and pleasant experience to find in one such accused company a soul—a soul devoted to cheerful public service. Most of us knew that it had one all along, for as surely as a corporation is made up of human beings, banded together, there's a real soul tucked somewhere in the structure if one takes the trouble to look it up.

The soul of the Southern California Edison Company evidently is called "Busy Buttons," if one is to take as indication the attractive little pamphlet recently issued under his auspices.

And certainly, whatever else they may have been accused of lacking, public utilities have never lacked of dignity and of titles, the sound of which would leave no doubt as to the solidity of the institution. These have been valuable assets in their day. And yet, it has sometimes been felt that it is possible for a utility to lean backwards in its effort to maintain a straight, dignified posture, and that a graceful gesture now and then is not without its merits.

At any rate, a good deal is being said nowadays of humanizing industry. And it is likewise obvious that one of the chief obstacles to any "humanizing" process is the aloofness with which industry, for protection, perhaps, always has clothed itself.

But in "Busy Buttons," the pendulum may be seen to swing back home, for here is a common-sense, human, simple characterization, and with a name which rolls easily off the tongue. "Busy Buttons" is the creation of a very human sort of person anyway, Richard E. Smith, Advertising Manager, Southern California Edison Company, one who is by no means given to making choice of names without deliberate thought and care. Ushering "Busy Buttons" into the world, Hallowe'en Oct. 31, therefore, occasioned a carefully planned coming-out party.

The last few days of October saw announced in the daily press and 120 or more country papers serving the territory covered by the lines of the Edison company, that "Busy Buttons, the busiest fellow in the country," was going to broadcast over



A bright-eyed young emissary, "Busy Buttons," has just been employed by the Southern California Edison Company to carry its message to its 400,000 customers. This is an appreciation of that charming booklet, "The Story of Busy Buttons" and of the little trade character, "Busy Buttons," himself.

Radio KHJ on Hallowe'en. Simultaneously that very morning, each of the 300,000 customers of the company received in the mail "The Story of Busy Buttons."

"Who is this Busy Buttons?" immediately became one of the general questions of the hour. The answer was given that night over the radio to all who listen in, and who does not? It also was written down on the inside front cover of this attractively prepared pamphlet where all who cared might

read, and who would not read so charmingly told a story?

This is the story of "Busy Buttons," told as he would tell it, if he sat there at your fireside. "Busy Buttons" cannot actually go 'round in person, because he is not a really, truly person, but just the spirit of more than 80,000 people, his working partners of the Southern California Edison Company.

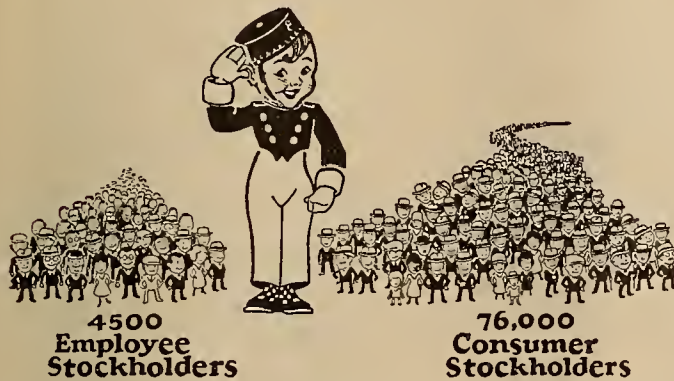
Other utility corporations have had and will have trade characters. In the past these usually have been named after some electrical term, some contraction or play on the company name. "Busy Buttons" is a pure creation. He hasn't an electrical watt, volt, ampere or ohm concealed about him anywhere. He isn't electrical in that sense.

"Busy Buttons" is a bright-eyed, cheerful, willing and winsome little bellboy, the like of which no hostelry ever possessed. He typifies the ultimate of service—quick, snappy, smiling service at the touch of a button. He isn't abstract like a kilovolt, for instance. He is perfectly obvious in that he is here to serve. His livery is that of efficient, recognized public service. His aspect is human and lovable. And the artist who drew his likeness put such a twinkle in his boyish eyes that no one could ever accuse him of not being "dead anxious" to please.

Best of all he gives his company a handle which the most ordinary human being may grasp without awe. A customer will listen to the story of "Busy Buttons" whereas he might be suspicious of or fear boredom by one from the Southern California Edison Company. "Busy Buttons," comprehensible and human, possibly may be worth getting acquainted with. The corporation, on the other hand, would merely be "spreading its propaganda."

The story of "Busy Buttons" gets off to a flying start in its first chapter and maintains its interest throughout. Because it is made up in a convenient

pocket size and runs its full length in 30 easily read pages, with illustrations in red and black that graphically convey the ideas to be expressed, it is



a booklet not apt to be set down, once it is started, to be finished at some other time—a time which seldom arrives.

In the first chapter, "How the Desert Became a Paradise and What Busy Buttons Had to Do with It," interest immediately is aroused.

A long time ago, when the first white men came to California, they found the same soil and sunshine and sky that we have today. But there wasn't a single city—not even a real estate office—because California lacked three vital things. These things were Water, Transportation and Power. People had to have water to drink, and the land needed water to grow things. People had to have transportation to bring them here. And after they got here they had to have power to run machinery, and pump water, and to keep things going generally.

The story goes on to tell how "Busy Buttons" found water in the high Sierra, harnessed it and brought it to the cities. From this, "Busy Buttons," tells of his more than two million masters, the people he serves, and of his 80,000 working partners, "who are the people who actually work to manufacture and deliver your power to you and the people who furnish the money with which the work is done."

Regulation by the State Railroad Commission then is explained simply in the third chapter, "Of the People, for the People, by the People." Establishment of rates, determination of kinds of service, sale of securities, use of capital, fair return on investment, and new construction expenditures, are tersely explained and justified.

People don't have to lend their money to "Busy Buttons." The only thing "Busy Buttons" can do to induce people to lend to him, instead of lending to someone else, is to pay them a good rental for their money, and run his business so economically that he can give everybody good service at low rates and still earn enough to pay these people regularly the interest that is due them and the returns which were promised them when they became partners.

With California's population, the Edison investment is shown to have kept pace in growth. If

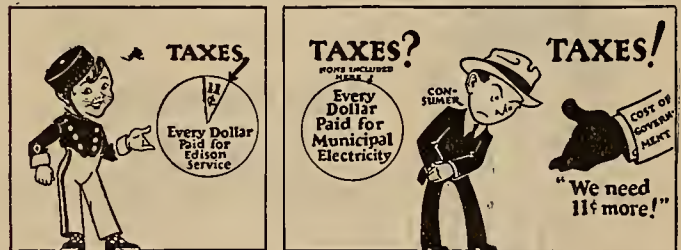
California is to keep growing, "Busy Buttons" tells the reader, the same co-operation from the public will be needed. How the money received by the company is spent for wages, materials, and for the cost of money is described next.

That "Busy Buttons" also must take 11 cents out of every dollar he receives and pay it out as taxes, is then explained, and in the next chapter, "How Busy Buttons Makes His Dollars Go Farther," he tells the story of the Edison company's engineering achievements which have resulted in lower operating costs, saving the public money—"Busy Buttons" having been awarded for his meritorious service the Coffin Medal.

Opportunity is taken to point out that, with equal rates, stockholder ownership, by giving a greater reward for efficient operating, engineering and business ability, is able to give equal service with less invested capital than municipal or political ownership where the individual reward is at a minimum.

Good management makes the money go farther. When money has to take the place of management, more money must be used.

Why it is that with water costing nothing, the expense of generating and distributing power must determine the cost of electricity, is explained next. Then follows an explanation of the necessity for steam standby plants for emergencies. Methods of distributing electricity are different from those of



distributing merchandise, it is shown, and in a few words the long transmission lines and the networks of lines maintained by the system to supply "Busy Buttons'" service are dramatically set forth.

One of the best bits in the book is to be found in the treatment of the company's efforts to reach farmers so that cities may have their produce and all may benefit. From this point, the story flows naturally into the subject of rates being equalized over the entire system so that the farmer may enjoy the benefits of electricity as well as the manufacturer and city resident.

— for it takes a struggle to get started on a new farm. If "Busy Buttons" can help the farmer to raise a crop, just that much sooner will the city man share in the proceeds. A ton of alfalfa will pay for a suit of clothes. Until the alfalfa is raised the suit cannot be sold—and there you are . . . It would be possible for "Busy Buttons" to charge less for his service in congested dis-



tricts, but then he would have to charge more in sparsely settled territory. That would destroy the balance. It costs the post office less to carry a letter to the next block than to carry one clear across the continent, but the charge is the same.

The future of "Busy Buttons" then is looked into. A telling comparison is made between the magnitude of the Edison projects and that of the Panama Canal project. Yet it is done in a way that is not boastful. Always it maintains the air of modest instructiveness.

That future requirements of the growing community served by "Busy Buttons" will require still greater investments leads naturally into "The Partnership Busy Buttons Offers You." At this point an insert, offering detailed and more technical information regarding securities, is offered by "Busy

Buttons," and the charming little book closes with a sincere expression of thanks:

And this is the story of "Busy Buttons," as related for his 80,000 Edison Partners, to the people whom they serve,



Two "Big Leaguers"



in Engineering

in order that all of us may understand one another better, and, "Busy Buttons" most sincerely hopes, be mutually more helpful one to another. I thank you.

All very well, but what continuation is to be provided for this interesting characterization? Immediate plans are quite definite on that subject, and future plans for the young fellow are to be worked out as he gets along in the world, according to Mr. Smith. The radio program, similar to "Busy Buttons'" introduction into the world, is being thought of as a means of keeping him before his public, perhaps in a monthly entertainment. "Busy Buttons'" working partners, the employees of the company, meanwhile will identify themselves as brothers of the fellowship by wearing a small "Busy Button." Vitachrome posters of "Busy Buttons" will be used to display electrical merchandise in Edison windows, and the young man is to be established in every way possible as the representation of the Edison company spirit of service in future advertising campaigns undertaken by the company.

To safeguard "Busy Buttons" from chance or deliberate kidnapping, the Edison company intends that each appearance of the youngster will be properly bodyguarded by Uncle Sam's copyrights.

And while the Edison company has not thrown its dignity overboard by any means, it has conceded that its representation as "Busy Buttons" will be effective and will be cheerfully received when carrying the Edison message to many of its customers. And too, while it will not become the "slogan" or supplant the title of the company itself, it is not inconceivable that there are members of the human family who will come to know the Edison company better through "Busy Buttons" and may even prefer to know it by that name, for it is a name which symbolizes that which they require of a public servant, and it is much easier to say in ordinary conversation.



Two Examples of Equalized Rates

BUSY BUTTONS

**broadcasts
over
STATION
K H J**

**Saturday
Oct. 31**

[8:00 to 11:00 P. M.]



SERVICE in the home and song on the air! Turn the dial to K H J and listen to a program which represents the goodwill greeting of Busy Buttons—the Spirit of Edison Service and the representative of the 80,000 Edison Partners.

**Have You Received
Your Copy of
"The Story of Busy
Buttons"**

?



We are sending one to each of our consumers. If yours does not arrive by Tuesday, tell the nearest Edison office.

**SOUTHERN CALIFORNIA
EDISON COMPANY**

Owned by those it Serves



One of the many outdoor Christmas displays in the Denver residential section last year.

Denver, the Christmas City

DENVER, the Christmas City of the World!

This was the objective of the Electrical League of Colorado of that city during the 1924 holiday season when it staged, in connection with one of the local papers, a contest which proved unquestionably successful in arousing the interest of the community to the advantages of exterior lighting during the Christmas season.

Featuring the contest in conjunction with the largest newspaper, the league obtained publicity many times more valuable than any which could have been provided by the organization in the display advertising columns, a total of 271 in. appearing in the paper during the campaign, and of this amount over 100 in. was on the front page. The result of this publicity is evidenced in the records of the league where during the 1923

***T**ROUGH the efforts of the Electrical League of Colorado a contest has been sponsored annually for the best outdoor Christmas display in Denver each year. This article describes the contest last year and the plans for 1925. That such contests are successful is evidenced by the fact that all Christmas-tree lighting sets were sold out last year and even lamps were at a premium. The idea is worthy of application in many other Western cities.*

holiday season about 400 outdoor installations were checked. During the last season this number was more than doubled, and assurance was given in every case that in 1925 the standard of individual installations would be improved and the number increased.

The league in planning the campaign followed the experience gained during three previous holiday seasons when such installations were suggested informally without any reward being offered in the form of prizes. In 1924, ac-

cording to S. W. Bishop, executive manager of the league, it was believed that sufficient consciousness had been established to warrant a definite proposition being made to the community. This took the form of an actual illumination contest for which thirty-two prizes were offered, ranging from a silver percolator set to a two-way plug. These



PICTORIAL proof of Denver's claim to the title, "Christmas City of the World." No. 1 shows a lighted Christmas tree on the lawn of one of the homes in the residential district. No. 2 presents the Capitol Hill Electric Company, winner of the Westinghouse contest for the best Christmas decoration. No. 3 and 4 give two views of the Civic Center. The first shows the huge central Christmas tree illuminated by 5,000 red, green and white lamps. The second shows one of the arches with Santa Claus and his reindeer on top. The arch is floodlighted. No. 5 depicts the residence of Col. A. E. Humphreys. In the grounds of this home were 18 evergreen trees illuminated with 1,800 10-watt colored lamps, each tree surmounted by a large star. The lighting load for this display exceeded 20 kw.

prizes were purchased by the league, excepting a number of flashlights and plugs which were donated by their manufacturers. In addition, several vacuum cleaners were offered as special prizes by the Public Service Company of Colorado for awards to installations not covered by preliminary rules of the contest.

These rules were extremely simple and provided only that the lighting should consist of either growing or temporary Christmas trees on the outside of homes, properly lighted wreaths in windows, festoons of colored lamps or the use of "Christmas clusters," an idea recommended by the league in the form of two or three red and green lamps which were installed in a multiple-plug cluster as a substitute for the regular porch light.

In many cases all of these features were utilized and a number of novel ideas were developed in addition, such as the use of illuminated porch baskets, sun parlor illumination, the use of flashers and "skiddoodle" plugs, and the general illumination of the grounds surrounding those homes having a large area. One installation alone, not included in the contest but perfected as the result of publicity given to the matter, was that of a prominent oil man and philanthropist who on the eighteen evergreen trees grouped before the porte cochere of his mansion used 1,800 10-watt lamps surmounted by a large white star. The lighting load on this one installation totaled 20 kw.

According to reports from Denver, many hotels and apartment houses featured exterior illumination and in every case carried the idea into the decoration of their foyers and lobbies to make them more homelike during the holiday season. Downtown business houses, especially the larger department and specialty stores, all featured exterior lighting effects of the same nature, and the league is planning a larger and more comprehensive contest for 1925 which will provide prizes for these various classes of buildings in addition to private residences.

Owing to the unusual Christmas decorations used at the Civic Center in Denver, the feature of which is the use of many thousands of colored lamps—a practice of a number of years standing—the development of the contest in Denver was correlated to the decoration and the turning on of these lights at the Civic Center, and to tie in the idea with next year's demonstration the league has recommended to the city authorities the planting of a permanent tree at the Civic Center that would serve each year as the center of the community Christmas tree activities.

In addition to the value of the development of the holiday community spirit in Denver, from a commercial angle such a campaign has definite commercial advantages, according to reports, not to mention the increased lighting load provided during the holidays. The sale of Christmas tree sets, special lighting stringers for use on 110-volt service, and the great demand for lamps from the Christmas tree variety to 40 and 50-watt colored lamps, was unusual; in fact, it established a new record in Denver. Less than 100 Christmas tree sets were to be found in Denver following the Dec. 25 rush,

and before New Year's day all these sets had been sold, together with all colored miniature lamps on hand in the city, a complete clean-out of this material.

In watching the development of outdoor lighting during the holidays the Denver league has observed a definite tendency to increase the individual installations each year. In other words, persons having one illuminated wreath in their windows or single set of eight miniature lamps on an outside tree added to that installation the following year. The cumulative result establishes newer and higher standards each year, and in those residence communities where growing trees are found it is said that an intense neighborhood rivalry has developed in order to determine who could perfect the best outdoor illumination.

Instead of making the competition a free-for-all affair between houses of all types, various sections of the city will be marked off and special competition will be encouraged within those sections and also in individual neighborhoods. In addition, sweepstake prizes will be offered for the most attractively lighted homes throughout the city. Special competition also will be provided for apartments and hotel buildings and it is possible, according to A. C. Cornell, chairman of the league, that a special competitive event for churches will be included also.

One or more special prizes will be offered for the most attractive displays in each of the suburban towns around Denver within the territory served by the league at the present time. To the other towns in the Mountain region encouragement will be given toward the development of similar local contests. The league will urge central stations and contractor-dealers to back such activities in connection with local civic organizations and newspapers.

In addition, the Denver newspaper backing the league in the major contest will stress the desirability of such Christmas lighting displays for the benefit of residents of other towns of the region where the principal newspaper has wide circulation. This, it is believed by league officials, will give the outlying towns, where there is an absence of organized effort at the present time, a double opportunity to capitalize on such a holiday feature as a community undertaking, and especially those towns where municipal Christmas trees ordinarily are installed.

To insure more interest, both on the part of the public and the electrical industry, it is planned to launch the contest in Denver with an announcement not later than Thanksgiving time. This will permit of almost a month for development of the idea. Within the industry employees of electrical companies, in fact the entire personnel of the electrical industry, are to be encouraged to complete plans for individual displays to be started not later than Dec. 15. Previous experience has shown that individual lighting effects made several days before the holidays will be observed eagerly and in many cases duplications made by other residents before Christmas Eve.

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE



Fig. 1—General view of Pacific Gas and Electric Company's Rice substation.

Pipe Framework Economical for Small Substations

Outdoor Switch and Bus Structures of Small Distribution Stations Standardized Upon to Advantage

By B. D. DEXTER, Assistant Engineer, Pacific Gas and Electric Company,
San Francisco

Pipe framework for switch and bus structures of small outdoor substations has been standardized upon and is used to good advantage by the Pacific Gas and Electric Company. The use of stock sizes of piping and standard fittings greatly facilitates the erection of these small stations, as well as reduces the investment required for their erection. Furthermore, such construction lends itself readily to this type of work, fills all structural and mechanical requirements, and presents a neat finished job.

A substation described in particular in this article is Rice substation (Fig.

1) located in Colusa County, Calif., 4 miles south of the town of Princeton. This substation serves as the distribution point for a moderate agricultural power load and is typical of small outdoor stations used by this company where the transformer bank capacity is not greater than 2,250 kva. This station receives power from a 60-kv. transmission line which is sectionalized with air break switches mounted in the line on each side of the station tap. (See Fig. 3.) The 60-kv. side of the transformer bank is controlled by a manually operated air switch and is protected by a 60-kv. fuse. Both

switch and fuse are mounted on galvanized-tubular steel poles. The transformer bank consists of four 750-kva. Allis-Chalmers self-cooled transformers mounted on concrete foundations and placed 9 ft. apart, center to center. The transformer bus work, including the 60-kv. and the 11-kv. disconnecting switches, is supported on a galvanized iron-pipe structure. The transformer bus structure consists of four 9-ft. bays, one for each of the four transformer units. As may be noted from the accompanying illustration, the concrete foundation for the bus structure and for the transformers themselves really forms one continuous slab. The makeup bus for the transformer is carried along through the bus structure on lateral supports at an elevation of about 12 ft. above ground level. The main 11-kv. bus is carried on the top of the structure at a height of about 19 ft. above the ground.

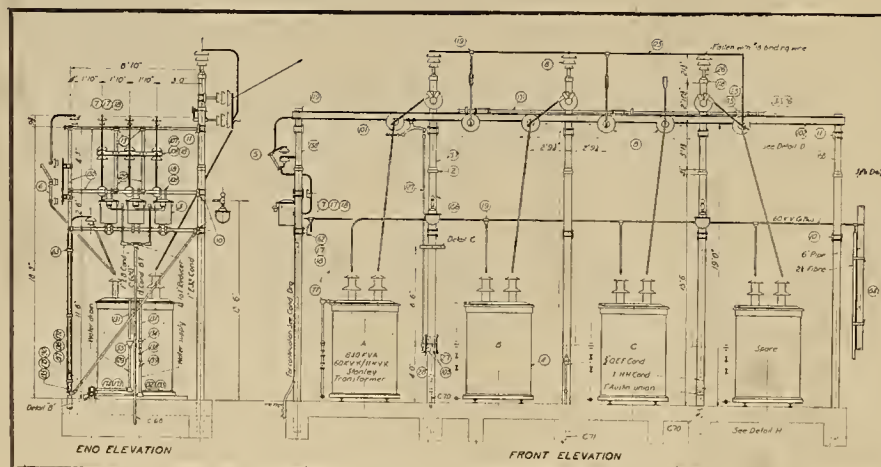
As may be noted from Fig. 2 a system of change-over switches is provided whereby the spare transformer unit may be cut in to replace any other unit by the mere manipulation of two air switches on each side of the transformer bank. Thus it is unnecessary to move any of the units in order to place the spare unit in service. This is a big advantage in reducing outage due to this change. Mounted at one end of the transformer structure are the three 1.5-kva. station power and lighting transformers. These units are protected by fuses as is the usual custom. From the transformer bus structure the 11-kv. bus is carried across a short intervening space to a two-section unit-type switch structure, from which emanate two 11-kv. distribution lines.

This unit-type switch structure is also of pipe construction and is a simple structure. A single oil circuit breaker is installed for each 11-kv. circuit, with the necessary disconnecting switches on each side and an air-break switch for by-passing the oil circuit breaker when it is necessary to take the latter out of service for inspection or repairs purposes.

Each 11-kv. circuit nominally is controlled through a General Electric type KFO-37 oil circuit breaker arranged for automatic reclosing.

A small galvanized iron steel frame building is used for the purpose of housing the necessary lighting panel and provides space for the storage of incidental station supplies. Thus it will be apparent that a very small and comparatively inexpensive building is all that is necessary for this type of distribution station.

Although the main station power transformer bank is protected by high-tension fuses, it has been found that the reclosing oil circuit breakers on the 11-kv. outgoing circuits operate entirely satisfactorily under conditions



of trouble and without blowing the high-tension fuses. This has been accomplished by the careful selection of the high-tension fuse capacity and by the careful calibration and the proper setting of the induction overload relays on each of the 11-kv. outgoing circuits. The operation of this relay and fuse combination for station protection has been entirely satisfactory throughout the history of this station as well as that of others of this type. An elevation of the station layout is shown in Fig. 4 and a wiring diagram in Fig. 5.

Ten Commandments for Foremen

1. Be fair. Have no favorites and no scapegoats. A foreman has to act as judge many times a day; therefore be just.
2. Make few promises and keep them. A foreman must be exact in this particular. Sometimes a foreman forgets that his job requires a high standard of truth and honor.
3. Do not waste anger. Use it. Anger is valuable and should not be used carelessly. Keep your most forceful language for special occasions.
4. Always hear the other side. Never blame a worker until he has been given a chance to give his point of view.
5. Do not hold spite. Forgive. When you have to scold a workman, go to him later and show him his faults in a friendly way.
6. Never show discouragement. Never let yourself be beaten. A foreman must have perseverance and the "never-say-die" spirit.
7. Notice good work as well as bad. Let the worker see that you can appreciate as well as condemn.
8. Watch for special ability. Take a keen human interest in your workers. Put each one where he can do his best.
9. Take your full share of blame. This is the most difficult of all. The foreman who can share both blame and praise with his workers has discovered the secret of managing men.
10. Prevent accidents. Educate or eliminate the careless man. The good foreman is known by his men. He is a safety foreman.

—Contributed.

Threading Rope Through Tackle Block

Nearly everyone undoubtedly has had occasion to spend considerable time in trying to thread the ragged end of a rope through the tackle block or through some oddly shaped hole or through a hole in which the rope is an extremely close fit. Rope always expands when it is pushed.

A simple way to overcome this difficulty is to pass a piece of cloth through the hole. This is easily done if the cloth be slightly twisted. Then fold the corner of the cloth around the end of the rope so as to surround it completely, forming a sort of a cloth tube. When the cloth is drawn back through the block the rope's ragged end will be drawn together and pass through the hole without any trouble. Light cloth is all that is necessary unless the rope handled is very heavy or of a wire texture, in which case a piece of heavy canvas will serve.—R. A. Horton in P.P. & L. Bulletin.

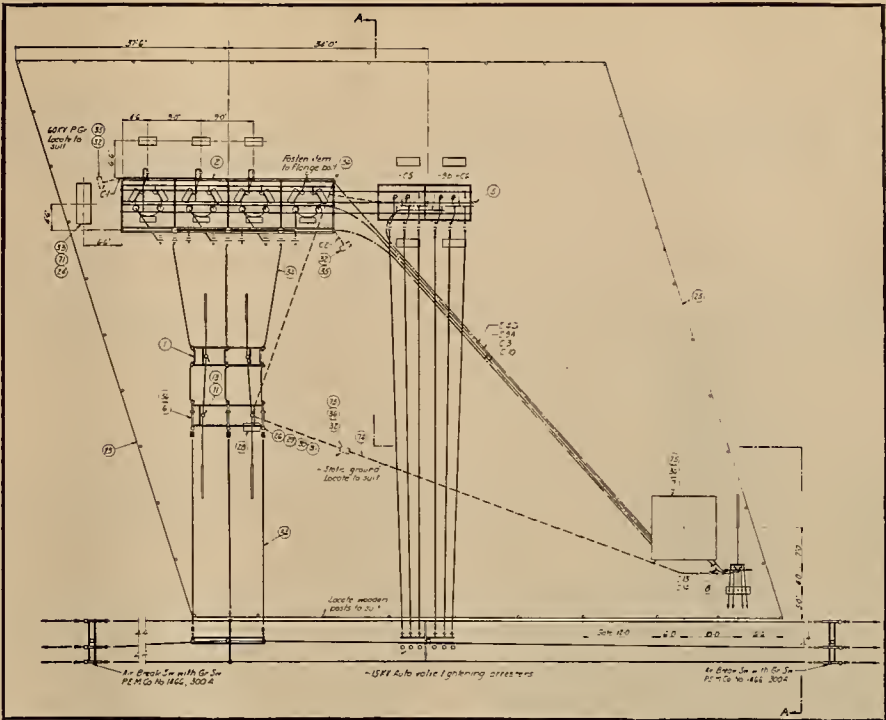


Fig. 3.—Plot plan of station showing among other things the 60-kv. line sectionalization switches.

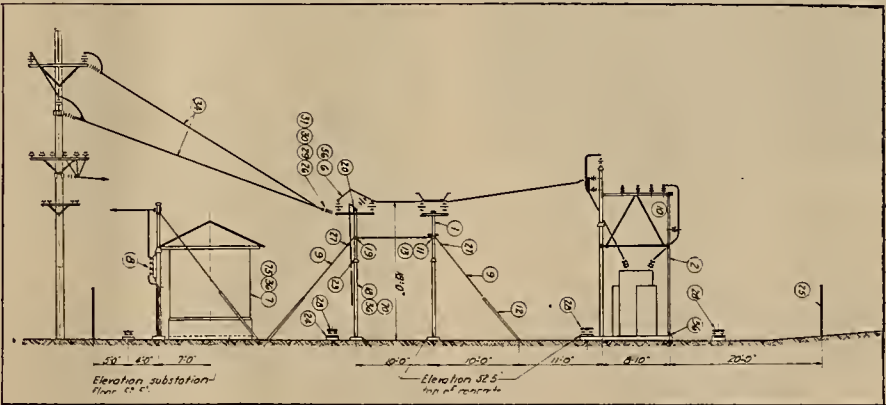


Fig. 4.—Showing relative arrangement of various structures.

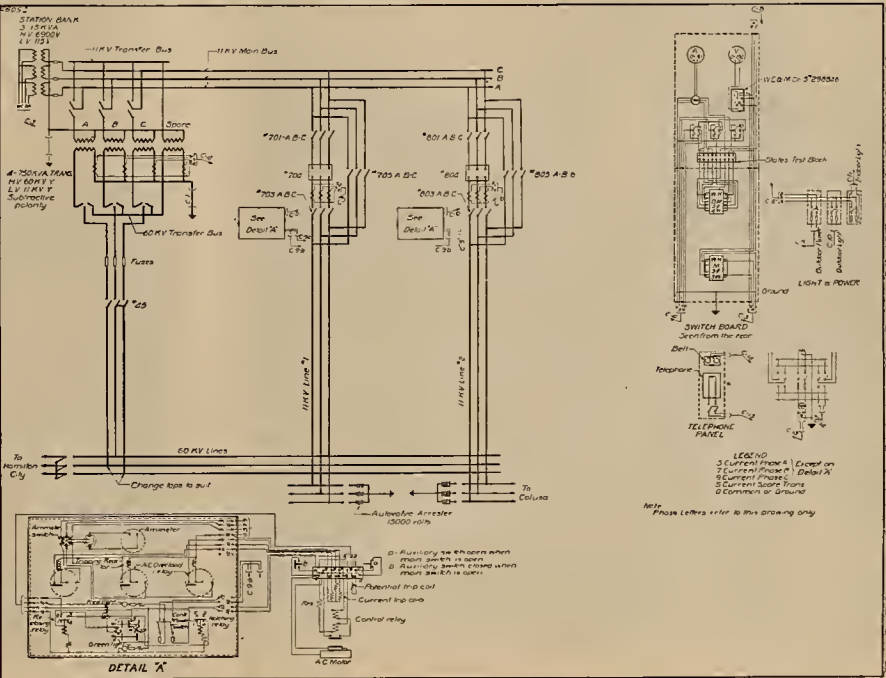


Fig. 5.—Wiring diagram of Rice Substation of Pacific Gas and Electric Company.

IDEAS FOR THE CONTRACTOR

Electrical Advertising—Its Forms and Design—I The First of a Series of Four Articles on the Forms, Characteristics and Design of Signs

By C. A. ATHERTON, National Lamp Works of General Electric Company

Electrical advertising, as the term is used here, comprises all forms of display advertising which are illuminated by electric light to increase their effectiveness by day, or to make them visible and therefore useful after dark. Electrical advertising, because of its brightness, has an immense attracting power, and is probably the most effective form in which display advertising is used.

This series of four articles will be devoted to a discussion, first, of the principal forms of electrical advertising and their suitability to various uses; second, of the general characteristics that may be utilized in making electrical advertising effective; and, third, of the fundamentals of design that give a sign legibility, smoothness, and proper brightness.

Classes of Advertising

Advertising may be divided roughly into two general classes. The first reaches people in their homes and it remains at hand until they have leisure to see and read. This is often called circulating advertising. The second class, or display advertising, is fixed in position and relies for its effectiveness upon being conspicuous and unavoidable, reaching its clients by catching their attention as they pass.

Display advertising, because it cannot move and because it must do its

work on moving people, must be very simple, striking—impressionistic. It must confine its efforts largely to an appeal to the senses.

The technique of the design and writing of advertising in its many forms has been studied at considerable length and many books and articles have appeared from time to time covering its many phases.

For effective display advertising differences in size and brightness must be emphasized; problems of design and arrangement of the parts of the display are of vital importance. This is particularly true in electrical advertising, where so frequently the figures and letters are formed, not in printer's ink on paper or cards, but in light. These and other characteristics suited to the growing outdoor life of the people are bringing about a more rapid growth in the use and popularity of electrical advertising than of any other publicity medium.

Forms of Display—Their Fields of Application

In general, displays may be divided into two classes; detached and attached advertising. The chief distinction is that for the former, space is bought or rented at important traffic centers, on roofs or in vacant lots without reference to the immediate surroundings and the display concen-

trates its effort upon the creation of a favorable impression in the minds of the passers-by for the product or service advertised, while for the latter, there is in addition to or entirely replacing this general impression-creating effect, another which has as its object that of labeling the particular locality. National advertising is generally of the detached, and most local displays, of the attached variety.

Detached displays are chiefly (besides street car cards) painted bulletins, poster panels, and large electric signs. Attached displays are chiefly exposed-lamp, enclosed-lamp, silhouette, and reflected-light signs, and building outline lighting, marquee lighting, and floodlighting. No two forms of display ever leave quite the same impressions. The effect of each of the available forms of display should therefore be very carefully considered before the ones to be used are selected.

Electric Signs

There are three general types of electric sign construction and these may be described as exposed-lamp, enclosed-lamp, and silhouette signs.

Exposed-lamp signs are best suited and most frequently used for electrical advertising which must be effective at the greater distances. Signs are seldom built for effective legibility of detail at distances greater than two miles or for visibility and identification at distances more than ten miles. These signs may be designed to give the strongest attracting power and the greatest individuality; they may be made the most brilliant; and they excel in their adaptability to the use of color and motion. For locations where the maximum reading distance is less than 250 ft. exposed-lamp signs are less effective and not often used.

Enclosed-lamp signs consist of luminous letters of glass either of small round lenses, painted sheets, or shaped

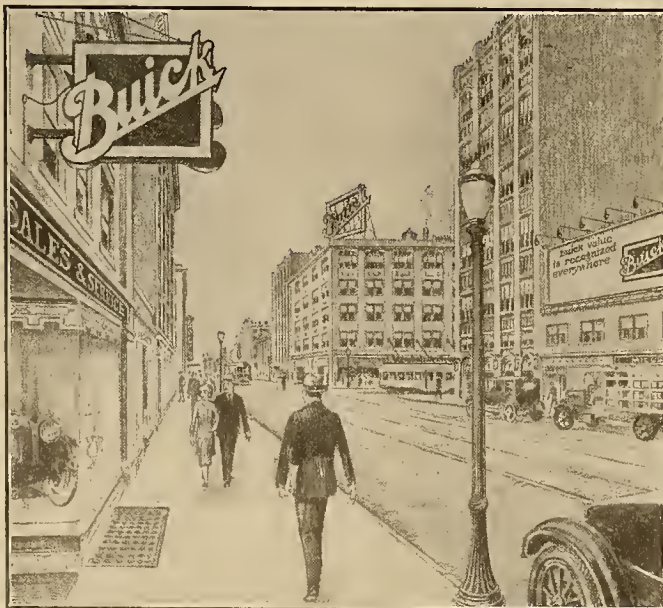


Fig. 1.—Display advertising may be attached or detached—a location marker or an impression builder.



Fig. 2.—Types of signs. Left: Exposed-lamp signs. Upper: Enclosed-lamp sign. Lower: Silhouette sign.

opal plates mounted in a metal case. They are best suited and most used for small location markers. Of these, the neatest and most suitable for all ordinary purposes, are the opal glass letters. Signs of this type are usually effective at viewing distances up to 500 ft. For signs the maximum reading distance of which is to be less than 250 ft., this type is the accepted standard. In particular, they excel for low hanging po-

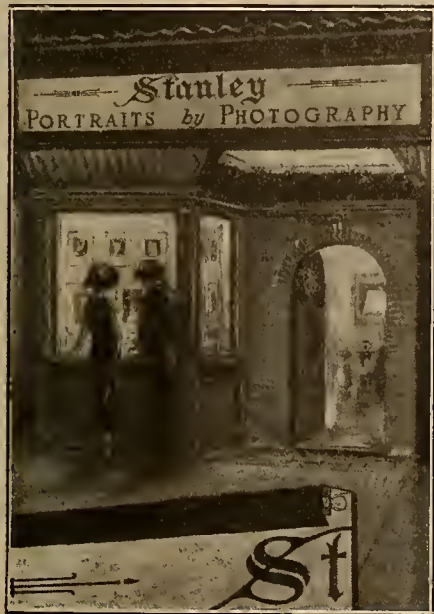


Fig. 3—Painted signs also may be effectively illuminated in the manner of miniature bulletins.

sitions and for day and night advertising. They are not well adapted to the use of motion or picture and are seldom used with changing colors. In general, they are of the attached display variety and are chiefly used as plain-letter location markers.

Silhouette Signs

There are two general varieties of silhouette signs. In the first, the lamps are mounted in a trough over or, preferably, surrounding the letters and the lettering or pattern is suspended in front of the brightly lighted background. In the second, the lamps are mounted on the backs of the letters themselves but again their purpose is to light the background against which

the lettering or pattern stands out dark in contrast.

Silhouette signs have of late been gaining in popularity, but in many districts they would still have the advantage of individuality. They are usually considered more conservative and less garish than exposed-lamp signs and some forms of enclosed-lamp displays. They may be made in any size but become less effective at great distances because of the difficulty of making the background sufficiently bright to carry through the smoke and haze of ordinary city atmosphere. The practical limit to their effective range is between 1,000 and 1,500 ft.

Illuminated Boards

There are three general types of illuminated board publicity, which differ principally in their advertising use and in the materials of which the pattern is made. They are called poster panels, painted bulletins, and painted signs. From the lighting point of view all three are alike. In the field of outdoor advertising, illuminated poster boards combine the greatest possible use of a beautiful picture and reiteration—two very great factors in impressing an advertising message—and for a given expenditure, the same story can be told through this medium to the greatest number of people. They are used to create a general impression which will become effective when next the article is needed or the location approached. They are therefore used principally for nationally advertised and nationally distributed merchandise. They are most effective in the popularization of the association of a particular brand with a particular quality, in the creation of a favorable impression on a large group of purchasers such as automobile owners, farmers, etc. They are practically always detached displays.

Painted signs are really bulletins which are used exclusively as location markers. In their advertising use, they are like enclosed-lamp or silhouette signs; in their illumination requirements they are like bulletins. They are the least expensive form of illuminated location marker.

Painted bulletins are similar to, though more restricted in their application than, poster panels. They are used most effectively for creating a general impression on a smaller group

of people, such as the inhabitants of a city, for example, on motorists who are approaching and must pass a certain hotel or garage, etc. They share with poster boards the adaptability to the use of picture and to a lesser extent, reiteration. They are sometimes used to mark a location, and, to some degree, are used for national advertising in exactly the same way as are posters; just as poster advertising is



Fig. 4—This building, because it is striking in itself, because its tower stands apart, because the business it represents is dignified, is a very good subject for floodlighting.

also used to a limited extent in a restricted territory to create immediate sales. Generally they are detached displays.

Building Displays

There are three general types of building displays which may be described as exposed-lamp, enclosed-lamp, and floodlighting displays.

Floodlighting for buildings is the most dignified and probably the most widely used form of building display. It is especially suitable when all of the following conditions obtain:



Fig. 5—Left: Outline lighting makes this ferry depot a vivid display by night—as impressionistic as by day. Right: By means of 13,000 lamps, the outlines of this imposing building are drawn on the sky.



Fig. 6—In a few displays, as in this one, are there adequate brightness, attracting motion, brilliant colors, beautiful individuality, a picture with a strong appeal, and very great size.

A. When the building is monumental, has natural beauty or striking architecture.

B. When the building has walls of relatively light color.

C. When the building stands apart—is not crowded in among other buildings—and especially when away from the brightly lighted portion of the city.

D. When the business or activity advertised demands dignified, conservative and quiet, rather than sensational publicity.

When all conditions are favorable, floodlighting is extremely effective and beautiful. When one of the first three conditions is lacking, the display may be very disappointing.

The use of enclosed-lamp building displays has been retarded in the past through failure to have the architect make provision in his first plans for recessing the lighting equipment, holding the cover glasses, and for easy maintenance. With the growing appreciation of the commercial advantage of some form of distinctive building display and the desire to control both the daytime and night appearance of the buildings they design, architects will in the future doubtless more often find it advantageous to incorporate enclosed-lamp displays.

Exposed-lamp building displays are usually called outline lighting. They vary from a single line under the cornice to an elaborate tracing of the outlines of an entire building. They may follow the architecture of the building or may superimpose an entirely different appearance on the building. The effect may be very beautiful and is, when a building of unusual or striking appearance is outlined and seen at some distance; or it may be very sensational as in the case of much of the outline lighting used in amusement parks. Although almost any general tone that is desired may be obtained with outline lighting, this form of display has more often been used by establishments catering to the bargain-hunting, transient trade, and is usually associated with wide-awakeness, quick turn-over, etc.

Characteristics of Electrical Advertising

Inasmuch as display advertising depends for its effectiveness entirely upon its ability to catch the attention and leave an impression from a glance, it is well before considering the design of such displays to review the characteristics that may be incorporated for accomplishing this end. The following are the most effective characteristics of electrical advertising:

The attracting power of brightness is instinctive—its appeal to the senses is of the most elementary sort. Bright objects are, moreover, more quickly comprehended.

Automatic motion is an exclusive characteristic of electrical advertising and its appeal is also dependent upon instinctive feelings.

The use of color is one of the most powerful means of creating an atmosphere—an inner feeling—a pleasant association, and these are among the chief functions of display advertising, particularly in its appeal to women.

One of the greatest weaknesses in much of the electrical advertising (small signs in particular) at the pres-

ent time is the lack of individuality. Greater advantage may be derived therefore from an effort to give a sign individuality—differentness—than in most any other way.

Psychologists tell us that the subconscious mind rejects the untrue and unbeautiful. It is certain that most people want to forget a displeasing impression. An effort to make the display pleasing will be rewarded many times over.

Advertising experiments have proved that newspaper space filled with a pic-



Fig. 7—No display should fail if it helps to carry some tie-in with the other forms of advertising done by the firm.

ture is seven times more effective in selling goods than is the same space in reading matter. A picture is instantly understandable to all and conveys far more than could be stated in the few words that may be included in a sign.

In an age when new size records are made almost daily, the biggest sign in

a district is not only more likely to be seen and remembered but is usually more likely to be talked about.

Best General Combination of Characteristics

Not all of the preceding characteristics are obtainable in the same degree in all forms of electrical advertising. The purchaser should select a display with a view to the particular advertising requirements and the power of the display to meet them. The advertising impression that is required must be decided upon. It is necessary to know the following:

A. The definite message that the advertiser wishes to tell, stated in as few words as possible.

B. The general impression to accompany this message. Does he wish his establishment to be thought of as conservative or as sensational? Does he want to appeal to the single-trade transients or does he wish to build his trade slowly on "repeaters"? It is as illogical to use a gaudy, winking sign on a dignified old banking house as it is to advertise a continuous bankruptcy sale with a sedate, retiring, and inconspicuous location-marker sign.

C. The style of other advertising that the firm is doing. Many advertising programs are far less effective than they should be because the "tie-in" has been omitted. When a large sum of money has already been spent in other forms of advertising in establishing a color combination, a monogram, a trade mark, a characteristic name, or a slogan, the subconscious impression created thereby should be capitalized by using the same or a nearly related pattern in the sign.

Merchandising by the Electrical Contractor-Dealer

Extracts from the Report of a Special Committee of California Electragists Presented at their Lebec Convention

Recommending a full co-operation with the central-station program of merchandising, and asking that steps be taken to elicit from central stations and jobbers a like co-operation, the report of a special committee of California Electragists, Southern Division, on "Merchandising from the Standpoint of the Contractor-Dealer," was presented to the second quarterly convention of that division at Lebec, Calif., Oct. 16. The report struck a new note in the problem of merchandising and set a standard by which policies for future efforts must stand, it was the opinion expressed by many who heard the report.

Starting with a survey of the problem which has presented itself due to the very evident intent of central-station companies to begin merchandising on a serious scale, the report speaks of the sentiment in favor of such a program evidenced at the N.E.L.A. convention in San Francisco. The report states, however, that the central stations are not unmindful of the importance of contractor-dealers. As evidence of the central-station program, and also of the recognition of the status of the contractor-dealer, the report, reproduced here in part goes on to state:

"In support of these statements we quote you briefly and at random from some of the papers referred to, as follows: From the July number of Elec-

trical Merchandising relative to the recent N.E.L.A. convention:

"The report of the appliance committee . . . was unquestionably the high point of the three afternoons of commercial meetings. It drew the bumper commercial crowd of the week. . . . First Vice-chairman Phillips . . . hammered home to central station men the reasons why they should sell electrical household appliances, and sell them hard."

"Edward S. Hurley, a manufacturer, in the same issue of Electrical Merchandising, writes:

"There is a very strong co-operative spirit on the part of many central stations towards their local dealers, in encouraging them to increase the sales of electrical home appliances of standard quality. This splendid spirit . . . has resulted in large sales . . . by both dealers and central stations, yielding substantial profits to both."

"In the September issue of Electrical Merchandising, J. E. Davidson, newly elected president of the N.E.L.A., says in speaking of a recent tour of the East:

"I was surprised very much when I found out that only 49 per cent of the power and light companies are now doing an active merchandising business. Executives, especially those of managing companies, should increase their interest in commercial activities."

... They should encourage those in the commercial departments of their companies. . . . Commercial men of power and light companies should work in close co-operation with all agencies who sell electrical merchandise. This can be done by close association in local electrical organizations; by furnishing aid and advice in arranging window displays; by frequent conferences to discuss proper merchandise and merchandising methods, and by co-operative advertising. Working together in this way it is inevitable that more sales of electrical appliances will be made, and that the purchaser will receive a higher grade of service."

"The Pacific Gas and Electric Company of northern California has just made public the details of a vast merchandising plan which takes the electrical retailer into consideration at every turn. Needless to say it has the whole-hearted support of our branch of the industry in its territory."

"Nearer home and more recently, we quote in part from an interview with S. M. Kennedy of the Southern California Edison Company as published in the *Electrical World* under date of Oct. 3, 1925. Mr. Kennedy was asked if the merchandising department of a public service company should be run on a profit making basis. His reply was:

"There are two reasons why the sale of appliances should be conducted on a merchandising basis. The first reason is that the power company should co-operate with the dealer and not engage in unprofitable ventures. The second is that there should be a margin of profit, sufficient to cover at least the actual selling expenses of the merchandise distributed because it might be said that part of the burden of selling the appliances to some consumers had to be borne by other consumers not interested in the sale of these devices. The Edison company is strong for working with and co-operating in every way with the dealer and contractor."

"The contractor-dealer has opportunities which are peculiar to his business and the power company should realize that assistance given the dealer will benefit all concerned."

"Further, the more such appliances and devices sold, the more work there will be for the contractor-dealer in the installation of wiring, fixtures and other materials to enable the appliances to be put in."

"And now a final quotation from another branch of the industry. James H. McGraw, Jr., publisher, writing in one of his journals under date of August, 1925, brings out the one most essential truth in the whole merchandising problem. He says:

"For fifteen years everybody in the electrical appliance field has talked 'sales,' gross volume, and 'how to get the business.' Yet, gentlemen, today it is not gross volume of sales we want. It is profit on retail capital invested. . . . We have been worshipping at the shrine of 'gross,' when we should have been putting our forget-me-nots at the feet of 'net.' . . . No matter what the urge or the seeming necessity, any future plan that sets aside dealer profits for gross volume, should be shunned like the plague."

"We believe that these quotations,

representing, as they do, the sentiment of leaders in other branches of our industry, firmly establish the premise on which your committee have based their efforts, namely:

"First: The central station is entering the field of merchandising as never before."

"Second: Their programs for most part contemplate a close tie-in with the retail dealer."

"Third: The whole industry recognizes the fact that if the contractor-dealer is to play the part expected of him, he must be assured a net profit on his transactions."

"The one and only reason for the renewed commercial activity on the part of the central stations is to build load. Their job primarily is to sell kilowatts; and more appliances sold mean more kilowatts sold."

"The thing now becomes a wheel within a wheel. More kilowatts sold mean more convenience outlets, more wiring and more business in general for the contractor-dealer, for the jobber, for the manufacturer, and, in short, for the whole industry. We decided, therefore, that there is no such thing as a merchandising problem considered solely from the standpoint of the contractor-dealer. The problem exists, but it is common to all branches of the industry."

"The central station wants, and must have, more appliances on its lines, more load. The manufacturer wants more and better outlets. The jobber wants bigger volume. The contractor-dealer insists that he is the logical point of contact with the buying public; and that to function properly he must make a net profit."

"Obviously, then, no single group can attack the problem alone and solve it to the best advantage to all, or even to the best advantage of its own particular branch of the industry. The thing must be worked out co-operatively by the several groups."

"Just what form a co-operative program of this kind should assume, your committee is not prepared to say; but we believe that when one branch of the industry evolves an idea or feels the necessity of an intensive selling campaign, that this fact should be communicated to the balance of the industry and their co-operation solicited."

"As an example, suppose a central station brings in a big block of power for which it must develop a market. Would it be better business for it to organize a special field force of salesmen and institute an intensive selling program all by itself, or to avail itself of a sales force already organized and in the field? We refer to the sales organizations of every jobber and contractor-dealer in the territory. Your committee hope that this thought contains the germ of an idea which the central stations may see fit to incubate."

"So far this report has dealt pretty much with generalities. We will be more specific. Some time during the month of August we came to you with a plan to make October a 'Toaster Month.' We recommended that, beginning with the first day of October and ending promptly with the close of business on the last day of the month, you offer for sale some one standard make of electric toaster at a price as much lower than the regular price as you, individually, could afford to sell

it. We laid particular stress on the point that whatever toaster you selected should be a standard make with a nationally known price, in order that the public would recognize your offer as a genuine bargain."

"There is nothing new about this plan. It was copied from the department store idea of 'leaders' and 'specials' sold at a loss in order to bring people into the stores and stimulate the buying spirit. We recommended that you display the toaster prominently, that you talk it constantly, and that you advertise it as much as your appropriation would permit."

"It developed that this plan very closely coincided with a similar plan about to be launched by the Southern California Edison Company. So it was not difficult to arrange that the two campaigns should begin and end on the same days. Jobbers and manufacturers, as you know, are assisting with advertising helps and other publicity to make our initial attempt a success. So, for the first time, we believe, in the history of southern California we have the whole industry working together to put over an idea."

"We have asked you to put all the enthusiasm possible into this sale and to keep an accurate account of the toasters you sell, together with a summary of other appliances sold as a direct result of the publicity. This information is most valuable, and if you fail to provide it you will fall far short of your obligation to the industry."

"In fact, the spirit in which you enter into this first attempt at co-operation with our fellow members of the industry, and the promptness and completeness with which you report the results, will influence to a far greater extent the future activities of the merchandising division than will the volume of merchandise actually sold."

"We shall not be too greatly disappointed if the sales resulting from our combined efforts in this campaign fall short of the sales made by the Edison company; but we shall be chagrined indeed if we do not show a co-ordination of purpose that will inspire our leaders in the future and prove to associated groups that our co-operation is worth cultivating."

"Just at this point we want to interpose the gentle reminder that your committee did not work up this plan alone and spring it at you out of a clear sky a few days prior to Oct. 1. On the other hand, we came to you individually during the latter part of August, laid the details before you, and asked, 'Do you like it, and will you support it?' Almost to a man, you said, 'I do and I will.' So this is not our idea alone; it is yours as well."

"We, as a committee, are not trying to shift the responsibility. But we are trying to bring home to you the fact that the success or the failure of such undertakings depends, not upon the recommendations of a committee, but upon the spirit and enthusiasm with which the rank and file of the membership get behind them."

"We recommend that a permanent merchandising committee of four men be created, headed by Mr. Robertson, to administer the affairs of the Merchandising Division, thus relieving our Executive Committee and our Executive Board of these added duties."



Selling Electrical Christmas Gifts

CHRISTMAS comes but once a year, but that once, merchandisers of electrical appliances feel, is when Santa Claus is to be expected to fill their coffers with gold. It is not enough to sit back and wait for Christmas morning to bring that reward. A good merchandiser is one who meets Santa half way,

and makes it possible through increased sales for his stocking to be filled. From last year's Christmas experiences, the following merchandising ideas, which proved so effective then, are offered to others this season. Windows and salesrooms, billboards and other advertising media offer opportunity for sales presentation of an unique order at this time. From many admirable ideas utilized in last year's holiday campaigns the following have been selected as typical styles or methods of presentation.

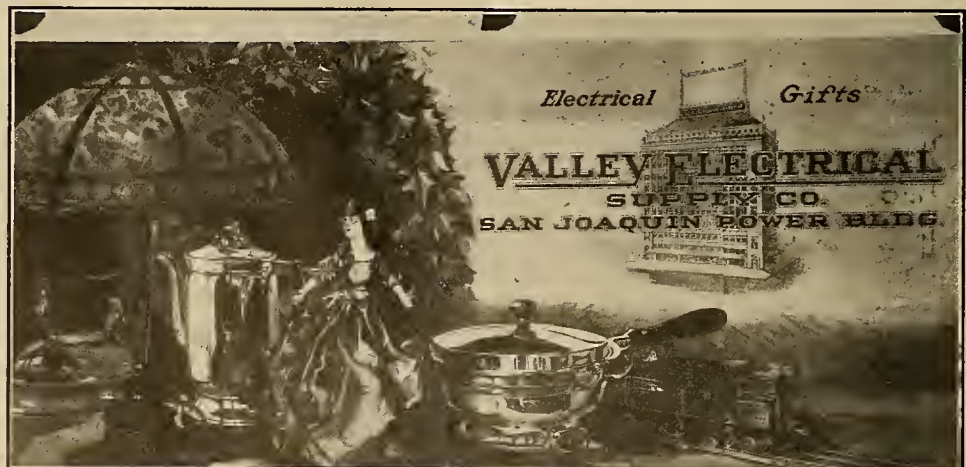


ELEGANCE and dignity, characteristic of high-grade jewelry displays, lent value to electrical merchandise in the windows of the Cascade Fixture Company of Seattle. A few choice articles, displayed against simple yet rich background, with good taste, were effective.



STRIKING the keynote of Christmas good will, the Public Service Company of Colorado made this message the center around which its merchandising displays were placed.

BILLBOARDS are effective in focusing public attention on the value of electrical Xmas gifts. Many forms of billboards may be used advantageously, the board on the right having been found a good sales help last year. Many 24-sheet posters are available to live dealers.





BEAUTIFUL backgrounds for windows are always attractive to the passing Christmas throngs. The window shown above made especially good use of a special background depicting old-time Christmas traditions, setting off the bright electrical merchandise in the foreground by its soft, subdued colors. Live evergreen trees, too, made this window of the J. C. Hobrecht Company of Sacramento an excellent one.



INSIDE the store it is important to maintain the holiday atmosphere, too. A tasteful display of merchandise in the showcases, a lighted Christmas tree, holiday decorations, all make Christmas shopping easy and pleasant, as the Valley Electrical Supply Company of Fresno found last year in its store.

ATMOSPHERE is created to good effect in each of the three window displays shown here. The upper left is that of the Idaho Power Company, featuring a nationally advertised line of electrical merchandise. The lower left window won second prize in the nation-wide Christmas window contest conducted by Westinghouse last year. It is the window of the Electric Appliance Company of Denver. The lower right is a window display used in all of the branch offices of the Pacific Power & Light Company last Christmas. Christmas display material furnished by manufacturers was used in each of these windows with excellent results.



What to do 'till Santa comes---

CRYSTALLIZED, much as the very mists of the higher atmosphere are crystallized into the snowflakes and icicles which make Christmas so colorful an event in everyone's life, the ideas which have solidified into bigger Christmas



A carload of cleaners Santa Claus is bringing to the housewives via The Washington Water Power Company. R. B. Carter, Northwest distributor of the Eureka cleaners, is seen helping Santa distribute his gifts.

season business for electrical merchandisers are to be found here. Check over this meaty presentation of sales methods and plans and see if your store cannot employ one or many of them to your benefit this Christmastide.

With plenty of stock, well chosen, and of high-grade merchandise such as requires little if any after-Christmas servicing; with sufficient trained or experienced help to sell your goods courteously to the customers, you may find it well to:

Plan special offers. Department stores use this method continuously. A feature price on some one appliance, or combination offers on two or more appliances, a convenience tap or some small premium, will bring many to your store to be shown and sold major appliances.

Arrange demonstrations. One southern company uses an out-of-door sales room. Window demonstrations are effective, but best of all are offers to demonstrate in the homes.

Telephone for prospects. An intelligent salesman at the telephone can call hundreds and interest them in special offers, appliances, and service, getting many good prospects.

Dress the store. Create the holiday atmosphere in your store. Make it a Christmas head-

quarters. No one can utilize colored lighting effects as can the electric dealer. Not only put up festoons and wreaths, illuminate them. Make your store the brightest, prettiest, most colorful place in town.

Dress the windows. Nothing is so important in selling merchandise as the well lighted, well planned window. Window competition is keen these days, especially at Christmas. You can outshine them all for color, illumination. If you haven't facilities for window decoration, every manufacturer of electrical goods can provide you with excellent material at very nominal cost. Originality and brightness are your two big assets. See them.

Advertise thoroughly and well. Use carefully planned newspaper space. Make advertising your salesman. Tell why electrical appliances are superior to old-fashioned housekeeping methods. Make terms attractive, and emphasize the service you are prepared to render.

Mail Circulars. Revise your mailing list. Put your Christmas specials on the backs of your envelopes. Mail circulars with all letters. Your manufacturer or jobber can supply you well prepared circular or broadside material.

Use billboards. If you can get the dealers of your city together on billboard advertising,

Public Power & Light Company
OFFICE OF THE GENERAL MANAGER

THE URGENCY OF THE SEASON MAKES THIS A PRINTED MESSAGE NOW YOU'LL GET IT IN TIME [OVERRIDE]

BETTER LIGHTING FEELS UP CHRISTMAS BUSINESS

Proof: New Grand Leader Department store, Chicago

On the ground floor of the New Grand Leader Department store, Chicago, the power of light is being demonstrated in a most effective manner. The store is now open for the Christmas season and the power of light is being demonstrated in a most effective manner. The store is now open for the Christmas season and the power of light is being demonstrated in a most effective manner.

Aimed at the merchant who would sell any kind of Christmas merchandise, this message was mailed to retail store proprietors early in December, 1924, and resulted in increased window lighting installations and lamp sales.

all will benefit. If not, use a few yourself. The 24-sheet posters are available from many manufacturers or the Society for Electrical Development.

Other advertising. Car cards in street cars, stickers for windshields, banners for your store's automobiles and trucks, electric signs, illuminated window signs, Christmas wrapping paper carrying your store name—all these are helpful. Advertise delivery service, say, with "night before Christmas" delivery. Strike some original note in your store advertising and carry it on emphatically throughout the Christmas season.

Promote electrically lighted trees. The example set by Denver, and many other cities for contests with prizes for the best lighted Christmas trees, in selling every tree-lighting outfit in the city, is one worth following. Read of Denver's experience in the feature section of this issue, and then promote Christmas-tree lighting in your community.

The season will reward any dealer who pushes electrical merchandise this Christmas. For two or three years the idea has been advertised. This year should see the finest results of all.



Tony Sarg, the well known illustrator and creator of the marionettes, designed The Society for Electrical Development's annual co-operative window display for 1925, which is available through the Society. As might be expected, Mr. Sarg has departed from the customary interpretations of Santa Claus, and has presented the idea of electrical gifts for the whole family in an exceedingly clever manner.

ELECTRICAL Christmas giving was given a strong impetus by the carefully directed advertising of last year. In many instances co-operative advertising by all the dealers of a community, under the leadership of its electric club or league, was responsible for increased electrical sales to all.

NEWS OF THE INDUSTRY

Senate Committee Hears Plans of Boulder Advocates

The United States Senate Committee on Irrigation and Reclamation, in a two-day hearing, held in Los Angeles Oct. 26 and 27, heard described the problems pertaining to the proposed dam on the Colorado River and the All-American Canal. No power companies were invited to take part in the proceedings. It is understood that Arizona injected itself into the proceedings against the wishes of the association.

Los Angeles municipal-ownership advocates were strong supporters of a high (500 to 600-ft.) dam while Arizona favored a low (95 ft. upwards) dam at the present time for flood control only.

Los Angeles Bureau of Power and Light advocates were represented by E. F. Scattergood, chief electrical engineer of the city's water and power department. Mr. Scattergood outlined the policy of this group when he said, "Los Angeles stands ready to contract for all of the Boulder Canyon power that other communities do not need or desire. The city of Los Angeles stands ready to provide construction funds in proportion to its power allotment for the total cost of the dam and storage project, or for such portion of that cost as may not be provided for by Congress."

Representatives of Imperial Valley interests painted a picture of devastation and ruin with probability of great loss of life that is certain to come upon their portion of the country in the event that flood-control measures are not put into effect immediately.

That flood control is the only leverage which can be used effectively on Congress in getting any federal assistance in connection with the development of the Colorado River was brought out by Senator Key Pittman of Nevada when he stated, "There is, in my opinion, one argument which Congress cannot handle—the imperative need for flood protection of the Imperial Valley. Insist on flood control and flood control only, and you will have the right kind of dam, one sufficient for both power and water supply."

William Mulholland, veteran chief engineer of the city water department, devoted his energies to stressing the city's increasing water needs. "The only project in which Los Angeles is interested is a high dam at Boulder Canyon." He declared, "If any other project is undertaken this city will not be justified in having any part in it."

Mr. Mulholland expressed grave doubt as to the feasibility of carrying out a gravity-canal project from a dam at Bridge Canyon, which is mentioned as a future possibility in the report of E. C. La Rue made to the federal government recently.

The following comprised the committee: Senator Charles L. McNairy of Oregon, chairman; Senators Johnson and Shortridge of California, Ashurst of Arizona, Kendrick of Wyoming, Oddie of Nevada, Dill of Washington, Phipps of Colorado and Pittman of Nevada. The committee is making a tour of inspection through southern California, Arizona and Nevada so as to be able to acquire firsthand information concerning the much befogged question of the future development of the Colorado River.

All Colorado River Development Halts Till States Agree

All development of the water resources of the Colorado River and its tributaries, including the Gila and every other stream in the basin, is to be suspended until the seven states concerned can agree.

The determination to take this action, it is assumed, took place at the cabinet meeting Oct. 27. It seems to have been the consensus of opinion to let the states of the basin understand unmistakably that they must reach some agreement among themselves before any development will be allowed to proceed throughout the vast territory drained by the Colorado.

Mr. Girard, while admitting great disappointment that his Diamond Creek development cannot be begun at once, sees in this decision a new assurance that he is certain to secure his license in time. While the wording of the commission's resolution calls for the suspension of all licenses "for a reasonable time," it is understood that the full intent is to make the period as long as may be necessary to secure agreement. In the resolution the opinion is expressed "that constructive governmental policy requires that the states affected should, and they hereby are earnestly urged to, reach as speedily as possible an agreement among themselves for the division of the waters of the river system, all to the end that thereupon development may proceed unchallenged upon interstate grounds."

The Southern California Edison Company, Los Angeles, has applied to the Federal Power Commission for a preliminary permit covering the Mohave Canyon site on the Colorado River. It is proposed to construct a concrete dam 168 ft. high at a point in the canyon two and one-half miles below Topock. The application is in conflict with several other applications previously filed.

Western Utilities Company Buys Evans Light Company.—The sale of the Evans Light Company, operating in Malad, Idaho, to the Western Utilities Company has been announced. This plant was built in 1906 and has been in continuous operation since that time.

Report on Los Angeles Electric Power Supply Made Public

Stressing the rapid increase in the demand for electric power in southern California and urging that immediate steps be taken to procure additional power through development of the Colorado River, the report prepared for the Citizens Water and Power Committee of Fifteen of the Chamber of Commerce of Los Angeles has been made public. This report was prepared by L. S. Ready, chief engineer of the California Railroad Commission, and H. G. Butler, consulting engineer and state power administrator for the state in 1920 and 1924.

Briefly stated, the essential points of the report are as follows:

(1) The demand for electrical energy in southern California is increasing at such a rapid rate that immediate steps should be taken by those responsible for the power supply toward obtaining developments on the Colorado River.

(2) There should be no difficulty or economic waste under co-ordinate development in the absorbing of the power to be produced from the proposed Boulder Canyon development, when it becomes available.

(3) Energy from the Colorado River is the cheapest hydroelectric energy that can be obtained for southern California.

(4) The steam plants of the Southern California Edison Company are adequate to furnish standby service to the city until 1927.

(5) Two additional interconnection points should be made between the Southern California Edison Company and the Bureau of Power and Light of Los Angeles.

(6) The Bureau of Power and Light should have steam standby service under its own control. A unit of 25,000 kw. should be available in 1927.

California Oregon Power Company Acquired by Byllesby

Control of The California Oregon Power Company has passed into the hands of H. M. Byllesby & Company of Chicago, according to official announcement made in San Francisco Nov. 4 by John D. McKee, president, and J. D. Grant, chairman of the board of the Western company. Transfer of ownership was effected through an arrangement made by these two men acting for themselves and other stockholders whereby common stock of California Oregon will be exchanged for stock in a new company to be organized and controlled by the Byllesby interests.

The system of The California Oregon Power Company, located in northern California and southern Oregon, is a strategic link in the Pacific Coast interconnected transmission system, connecting as it does a large group of utilities in California with a second large group in Oregon and Washington. With other Western properties under the control of the Byllesby organization, it gives this company the nucleus of a large interconnected system.

H. M. Byllesby & Company already own the Mountain States Power Com-

pany, in Oregon, the Western States Gas & Electric Company, the Coast Valleys Gas & Electric Company, the San Diego Consolidated Gas & Electric Company, the Sierra & San Francisco Power Company and the Market Street Railway Company of San Francisco, all in California.

The Mountain States Power Company, operating in Oregon in the Willamette Valley and in northern Idaho and in Wyoming in the vicinity of Casper, has steam plants totaling 5,130 kw., hydro plants with a capacity of 4,250 kw., a connected load of 50,000 kw., and serves 24,554 consumers. It is interconnected with The California Oregon Power Company through a 130-mile, 110-kv. transmission line at Springfield, Ore. At Salem, Ore., it ties with the system of the Portland Electric Power Company.

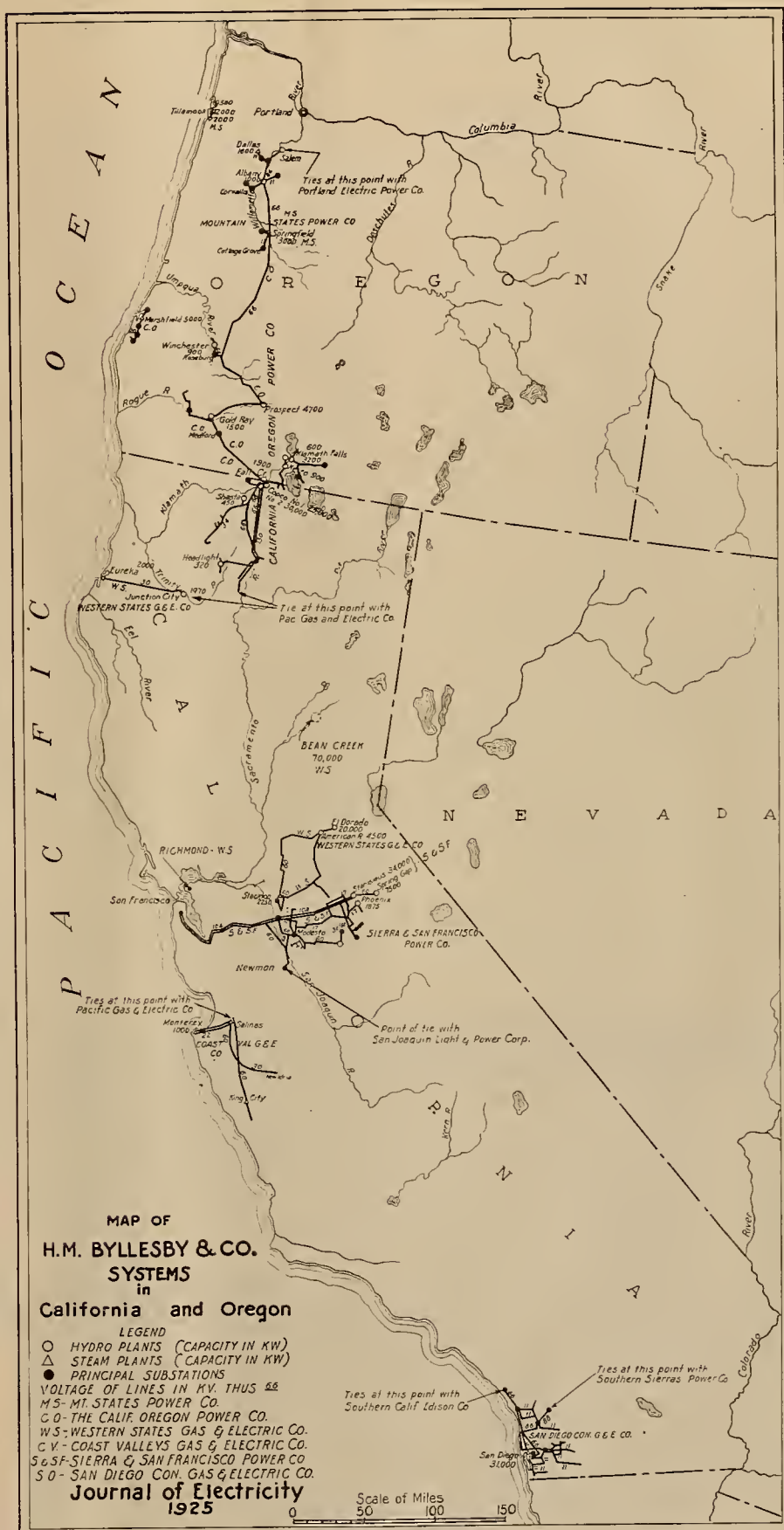
The Western States Gas & Electric Company serves territory in the vicinity of Stockton, Eureka and Richmond, Calif. Its Eureka properties are tied with the system of the Pacific Gas and Electric Company at a point easily within reach of an extension from the lines of the California Oregon system. Western States has an installed capacity of 27,080 kw. in hydro and 9,650 kw. in steam, a connected load of 72,250 kw., and serves 35,556 consumers. Its largest hydro station is the El Dorado plant on the American River. This company recently acquired the water rights of the Feather River Power Company on the Middle Fork of the Feather River and has announced the construction of a 70,000-kw. plant at Bean Creek to begin in the spring of 1926.

The Coast Valleys Gas & Electric Company operates in the vicinity of Salinas and Monterey, Calif. It serves 7,689 consumers and has a connected load of 20,357 kw. It purchases energy from the Pacific Gas and Electric Company.

The San Diego Consolidated Gas & Electric Company serves a region in the extreme southern section of California. It is interconnected with both the systems of the Southern California Edison Company and The Southern Sierras Power Company. A second interconnection with this latter utility is planned for the near future. The San Diego company serves 45,941 consumers with a connected load of 82,683 kw. It operates two steam plants in San Diego with a total capacity of 31,000 kw.

The Sierra & San Francisco Power Company, now under lease to the Pacific Gas and Electric Company, serves the northern portion of the San Joaquin Valley and has a 104-kv. line extending into San Francisco. Its principal hydro station is the Stanislaus plant with a capacity of 34,000 kw. The major portion of its output is sold under contract to the Market Street Railway Company. It is tied with the system of the San Joaquin Light & Power Corporation at Newman.

The California Oregon Power Company has a total installed hydro capacity of 70,210 kw. largely concentrated in its two Klamath River plants, Copco No. 1, with a capacity of 25,000 kw. and the recently completed Copco No. 2 with a capacity of 30,000 kw.



This latest acquisition by the Byllesby interests has started conjecture as to the feasibility of the interconnection of the major portion of the properties owned by that company with the proposed Bean Creek plant as a starting point. Such a procedure would result

in the formation of a 110-kv. bus extending from Stockton on the south to Salem, Ore., on the north, a distance of approximately 600 miles.

The accompanying map shows the location of the Byllesby properties in California and Oregon.

New Fire Alarm System of Local Design and Manufacture Installed in Los Angeles

What is said to be the greatest forward step in the improvement of fire-alarm systems yet designed is presented in the new central fire-alarm equipment for the city of Los Angeles. The major work of installing this system has just been completed. The essential feature of the new system is the patented Degen grounding device which provides immunity to any failure in functioning by providing for alarms to be received over a circuit even though that circuit be broken.

A circuit interruption merely causes the alarm to be transferred over any other circuit with an instant of lost time. At the same time the trouble is recorded automatically at the central station, enabling the operator to transmit the alarm by a simple manipulation of switches. Individual emergency "dynamotors" for each district secure further insurance against interruption of service.

Under this new system when an alarm is turned in from any box in any part of the city it is recorded in duplicate on the paper tape of a double-pen or push register. This register automatically records the time of receiving. At the same time a single-stroke bell strikes the number of the box, a red light appears on the line board indicating which circuit is operating, and a red light blinks on the chief operator's desk, showing the number of the operating circuit and blinking the number of the box. The register and the line pilot lamps remain lighted until extinguished by the operator.

After the second round is received from the box and checked, the chief operator transmits the box number to all engine houses over the primary or gong circuits. All signals sent out over either the primary or secondary circuits are recorded on a paper tape by the recorder which also automatically records the time of sending. Second, third, fourth or other special signals are received and transmitted in the same manner.

Another special feature of the system is the method of testing the boxes. By this system, boxes may be tested at the will of the chief operator without in any way interfering with the transmission or reception of alarm signals.

In case of an open circuit the pilot

lamps light, indicating the number of the circuit, and an audible signal is received on a bell. Whether the ends of the open circuit are clear or grounded the signals are received on each side of the break in a manner similar to that outlined above for normal operation. The only manipulation necessary on the part of the operator is the throwing over of certain switches, which puts the circuit in condition. Should a ground develop on any circuit an audible and visual signal is given, indicating the particular circuit grounded. This circuit then is switched over to an individual "dynamotor."

Like the majority of fire-alarm systems used throughout the United States, the Los Angeles system is of the closed-circuit type but is designed for a common battery with a motor generator set and a battery floating on the line.

The equipment in its entirety cost a little over one million dollars and was covered by a recent bond issue. The equipment is known as the Degen automatic fire alarm system, designed by Louis Degen, consulting engineer for the city of Los Angeles, and was produced in Los Angeles by the firm of Brown & Pengilly.

The system is designed to care for at least 5,000 alarm boxes which, it is planned, will take care of the city's needs for many years to come. A major portion of the system is in operation, and the rest will be completed as fast as the new boxes can be installed.

Puget Sound Company Builds New Power Line.—The Puget Sound Power & Light Company has started construction of a new power line along the Olympic Highway between Elma and Montesano. The line will cost \$17,000 and will be of the latest construction throughout.

Colorado Springs Office Closed.—With the purchase of the Western Public Service Company by Stone & Webster, offices at Colorado Springs, Colo., have been closed, and the headquarters of the new northern division have been moved to Scotts Bluff, Neb., with Samuel P. MacFadden as the general manager.

Utility Men to Address Students in Northwest Colleges

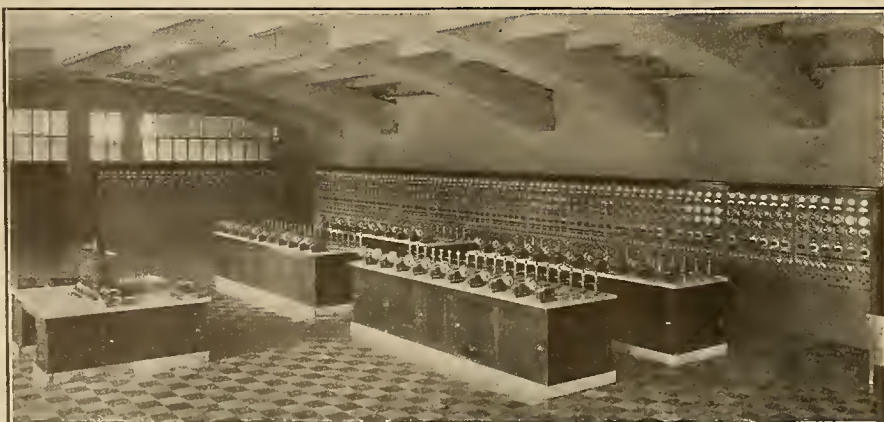
As an important activity of the Public Relations Section of the Northwest Electric Light and Power Association this year, the Committee on Co-operation with Educational Institutions has arranged for speakers from the power companies to present a series of subjects throughout the year to students in electrical engineering and business courses at the Washington State College, Pullman, and the University of Idaho, Moscow. This was the result of a meeting held Oct. 16 by this committee, in company with professors and department heads of the two institutions, in the office of Edward C. Johnson, dean of the college of agriculture, Washington State College. Under this plan, subjects of more or less general interest such as rates, regulation, franchises, financing and similar topics, will be presented by those officials of Northwest companies best fitted by their own experience to discuss such subjects, these men being chosen from a number who have volunteered their services for this work.

A. J. Priest, attorney for the Idaho Power Company, Boise, chairman of the committee, presided at the meeting, which was addressed by Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane, president of the association, and by W. H. Ude, director of public relations of The Washington Water Power Company, chairman of the Public Relations Section. Representatives of the two universities present, besides Dean Johnson, were: H. V. Carpenter, dean of the college of engineering; H. W. Cordell, professor of economics; R. D. Sloan, professor of electrical engineering; L. J. Smith, associate professor in agriculture; and H. L. Garver, special investigator in rural electrification, all of the Washington State College; and Ivan C. Crawford, dean of the college of engineering, and H. C. Dale, professor in school of business, both of the University of Idaho. All the educators expressed themselves as heartily in favor of the plan as adopted at the committee meeting.

Arizona Makes Own Application for Colorado Project

The board of directors of state institutions for Arizona has applied to the Federal Power Commission for a preliminary permit for a development on the Colorado River at the Bridge Canyon site in Mohave County, Ariz. It is proposed to erect a rock fill or concrete dam, to be so constructed as to make possible an ultimate height of 1,000 ft. Such a dam will develop 1,000,000 hp., it is estimated. The purpose of the improvement is to impound water for irrigation, to reduce flood danger, to provide power for pumping and other purposes and for marketing, and to provide water free from silt.

Fred T. Colter, of Phoenix, Ariz., on behalf of the state of Arizona, has asked for a preliminary permit covering a storage dam in Glenn Canyon and a diversion dam at Bridge Canyon. No explanation is made in the application as to the conflict with the application filed by the state for rights at Bridge Canyon only.



Central control station of the new fire-alarm system just placed in service in Los Angeles. At the right may be seen the wire chief's desk; next the signal-receiving tables, and to the right and to the rear the signal-line panels.

Majestic Conducting Campaigns in Many Western Papers

Two extensive newspaper campaigns, one featuring its electric waffle iron and the other its electric heaters, are being conducted by the Majestic Electric Appliance Company of San Francisco in cities west of the Mississippi River. The electric waffle-iron campaign started Sept. 30 and will continue until Dec. 18 in thirty-one newspapers in California, Oregon, Washington, Idaho, Texas, Nebraska, Missouri and Wisconsin, with a total aggregate circulation of 1,298,512. The advertisements will be 3 col. by 10 in. in size and total 6,300 lines or 450 col. in. A feature of the campaign has been the preparation of six dealer tie-in advertisements, mats of which are furnished the newspapers with space for the dealer's name. Papers report satisfactory results from the use of these tie-in advertisements, which range from one col. by one in. to two col. by four in.

The electric heater campaign is running in thirty-six daily papers in California, Oregon, Washington, Arizona, Colorado, Texas, Missouri, Wisconsin, Nebraska and Minnesota, with a total of 1,817,575 circulation. It began Oct. 12 and will continue until Nov. 30. The advertisements, of which there are fifteen, aggregate 3,780 lines or 270 col. in. The same system of dealer tie-ins which was worked out for the heater campaign has been prepared for the waffle irons.

All copy for the two campaigns was prepared by the Lockwood-Shackelford Company of San Francisco.

City and Railroad Dispute Dam Site Grant to Garland

An incorporated city and a transcontinental railway seek to block the application of C. C. Garland of Tacoma in his efforts to secure rights for the establishing of a 730,000 acre-ft. reservoir near Mayfield, Wash.

The application, which Mr. Garland filed recently with R. K. Tiffany, state supervisor of hydraulics, concerns a site on the Cowlitz River, a tributary stream to the Columbia River, and incidentally a site for which he first filed application, as assignee for the City of Chehalis during December, 1923. Chehalis first intended the developing of the site as a power source for municipal distribution and later assigned the application to Mr. Garland, who apparently later severed his connections with the Chehalis project. The city of Chehalis, through attorneys, now seeks to hinder Garland from making a personal application on the site and protested officially at the one-day hearing which was held a short while ago before the hydraulics board but was not completed and has been set over for completion indefinitely.

Another protest against the granting of the Garland application has been filed by H. B. Earling, general western representative of the Chicago, Milwaukee & St. Paul Railway, who charges that the dam and reservoir, when completed as outlined by Mr. Garland, would raise the waters of the Cowlitz River a distance of 20 miles and damage a previously granted right-of-way. The railroad company claims that it may use eventually this right-of-way in the connecting of its present

line from Tacoma to Kosmos with a possible tributary line along the Tilton and Cowlitz Rivers.

In his personal application, Mr. Garland stated that if his petition was granted, the actual work of pouring concrete for the tunnel forms and dam would be started well under a year's time. He did not specify definitely the exact size or output contemplated for the hydroelectric plant, which was mentioned in the application as "intended for the distribution of light, heat current and for other electrical domestic needs."

One of the applications made by Mr. Garland, in which permission was sought to erect a 100-ft. dam at Mayfield, has been canceled automatically by the recent issuance of a permit for the erection of a 25,000-acre-ft. reservoir by the state supervisor of hydraulics to H. W. Crozier, representative of the Cowlitz, Chehalis & Cascade Railway. (Journal of Electricity, Aug. 15, 1925, p. 147.) The site, at which a dam 200 x 50 ft. is contemplated, is near Mossyrock, Wash., which is about six miles above Mayfield. Work on the dam and power house will be started within eighteen months, as stipulated in Mr. Crozier's application.

Another application which conflicts with one filed by Mr. Garland is that recently filed by R. W. Lincoln of Portland, Ore., on a 1,500-acre tract lying in the Toutle River valley a few miles east of Kelso, Wash. This application asks permission to erect a 110-ft. dam, 600 ft. long, and install an 8-mile pipe line and canal to conduct the water from the reservoir to the proposed power house. The labor and concrete needed for the erection of the dam alone would exceed \$1,000,000, as stated in the application, which would indicate that 2,000 sec.-ft. of water would be appropriated from the Toutle

River, which flows into the Cowlitz River from the Cascades. Mr. Garland early in 1923 made original filing on the tract now sought by Mr. Lincoln but has taken no further steps toward securing the granting of the application, according to R. K. Tiffany, state supervisor of hydraulics.

Cooking Schools at Salt Lake and Ogden Draw Big Crowds

Two electric cooking schools, one in Salt Lake City and the other in Ogden, Utah, recently were held simultaneously for one week. The school in Salt Lake was conducted by the Salt Lake Telegram, and that in Ogden by the Ogden Standard-Examiner. In both cities a number of merchants and electrical firms, including the Utah Power & Light Company, co-operated with the newspapers in broadcasting the message of electric cooking to the housewives.

Cooking contests in which the winners received valuable prizes offered by various firms, were conducted each day. Lectures and demonstrations were given by Miss Ina Scrivner in Salt Lake City and Miss Lulu Boyes in Ogden, presenting to the housewife by actual application the real meaning of electricity as an eliminator of drudgery in the home.

A large number of booths were provided by merchants, in which their wares were displayed, adding to the attractiveness of the interior arrangements.

Attendance at both of these schools surpassed that of the previous ones, and there was a marked display of interest on the part of those present, that seemed to increase each day.

Cooking schools where food actually is cooked by electricity are proving to be one of the best methods of carrying the electrical message.



One of the large crowds of women attending the electric cooking schools conducted by the Utah Power & Light Company, through the newspapers of Salt Lake City and Ogden. Merchants assisted the school by having display booths in which electrical appliances were placed on exhibition

Two Bills Proposing State-Owned Power Filed in Oregon

Making good the expressed intention of certain semi-political groups in Oregon, there have been filed with the secretary of state two proposed measures looking to the establishment of state-owned power systems. This filing is required under a law for the purpose of having the bills titled by the attorney general preparatory to the circulation of initiative petitions which, if sufficient signatures are obtained, will entitle these measures to a place on the ballot to be voted on by the people at the next general election in 1926. Both measures involve an amendment to the constitution of the state.

The first, sponsored by the Housewives' Council, Inc., Portland, has been called the Oregon Water and Power Board Development Measure, and seeks to vest the control over the conservation, development, storage and distribution of electric energy and water for irrigation and domestic purposes in a board of five elective members, the personnel of the first board being named in the amendment. Provision is made for the issuance of state bonds in an amount not exceeding five per cent of the state's assessed valuation, and for an initial appropriation from the general fund of the state of \$250,000 for an administrative fund, later returnable from the revolving fund created under the proposed act.

The title given to the second proposed measure, which was prepared and filed by the Oregon State Grange, is the Water, Water-Power and Hydroelectric Energy Constitutional amendment. This measure would authorize the state to control and develop the hydroelectric energy within the state, and to contract with political subdivisions and others for its transmission, distribution and sale; to maintain and operate plants in this connection, authorizing state credit and indebtedness to provide funds for the purpose of the act. As originally filed the measure placed no limit on the amount of bonds which might be issued under it, but a later filing restricted such bond issues to an amount not exceeding four per cent of the total assessed valuation of the state. Differing from the first proposed amendment, which attempts to specify the machinery of administration, that proposed by the grange places the administrative detail in the hands of the legislature.

Company to Serve Electrified Railway in Northwest

Pointing to the electrification of a portion of the Great Northern Railway in the Washington area, and involving the expenditure of \$10,000,000 in the developing of a total output of 100,000 hp. from a power house that will use all but 40,000 acre-ft. of the water flowing from Lake Chelan, a permit to the Chelan Electric Company, a subsidiary to the Great Northern, was issued late in October by R. K. Tiffany, state supervisor of hydraulics.

As stated in the application the actual work of constructing the dam, power house and tunnel lines will be started prior to July 22, 1926, with the provision being made that the work is to be completed within three years.

A total fall of 400 ft. will be utilized

by the plant which is to be located near the Columbia River, passing within a few miles of the lake. The dam, which will raise the level of the lake 10 ft. during the flood season, will be placed at a point approximately one-half mile below the lower end of the lake.

Through arrangements already completed, The Washington Water Power Company takes over the Chelan properties and site and will construct the project, and operate the plant when completed. (Journal of Electricity, Oct. 1, 1925, p. 263.) Provision is being made permitting the Great Northern Railway to purchase adequate power for the electrification of a portion of its Washington line within the next few years. The railroad intends to electrify its lines from Spokane through central Washington. A tunnel eight and a half miles long that will eliminate many miles of grades, snowsheds, and difficult roadbed, will call for the major electrification. This tunnel is to run from Scenic to Berne, through the Cascade range.

The Washington Water Power Company will place Victor H. Greisser, chief engineer, in full charge of the work of the new project. Arthur Turner, formerly chief engineer in the Columbia River Basin Survey, will be construction engineer in the Lake Chelan power project.

Luminaire Company Announces Change in Ownership

The Holophane Glass Company, Inc., of 342 Madison Avenue, New York, N. Y., with factory at Newark, Ohio, and the Holophane Company, Ltd., of Canada have been acquired by a group made up largely of executives and employees who have been associated with the Holophane company for periods varying from ten to thirty years.

The officers of the company now are: Otis A. Mygatt, president; Charles Franck, vice-president and general manager; Joel B. Liberman, vice-president and treasurer.

The following will continue in their respective positions: William A. Dorey, chief designing engineer; William A. Ingler, superintendent of the works; Thomas W. Rolph, managing engineer of the street lighting department, and Davis H. Tuck, engineer in charge of industrial lighting. Edward L. Bradbury will be sales manager.

Sand in Generators Denied by Seattle Superintendent

Charges circulated in the Northwest to the effect that, owing to faulty construction of the sand trap, the Skagit power house of the City of Seattle would have to be shut down have been denied by J. D. Ross, superintendent of the City Lighting Department. In a statement to a representative of the Journal of Electricity Mr. Ross says:

"The fact is that the floor of the tunnel is free of sand and gravel. Skagit River is a rather wild one, but if any small gravel does pass the screens during high water it goes through as it is a gravity tunnel with 250-ft. drop in two miles. The wear on the wheels, inspection from time to time shows, is no greater than would be expected in any stream carrying glacial silt."

U. S. Government Files Brief in Edison-Herminghaus Case

Upholding the contentions of the Southern California Edison Company in its case against the Herminghaus heirs, covering the question of riparian rights on the San Joaquin River, the United States government has filed a brief at San Francisco. This is the first time that the government has become a party in the case. The government's reserve rental interest in the power project, together with its desire to protect the public's interests in the matter of power development, are the reasons given for its present action.

An injunction now stands which prohibits the Southern California Edison Company from impounding the waters of the San Joaquin River. This restraining order was issued by Judge J. E. Wooley, sitting in the Superior Court of Fresno. (Journal of Electricity, March 1, 1925, p. 185.) If this decision of Judge Wooley is upheld by the upper court, it is pointed out in the brief filed by the government that any further hydroelectric development will be prohibited and this basic source of natural wealth remain undeveloped.

Order Equipment for Eagle Rock Substation Improvement

Anticipating the need for additional capacity in its Eagle Rock substation when the third Big Creek-Los Angeles 220-kv. transmission line is completed, the Southern California Edison Company has placed an order with the Westinghouse Electric & Manufacturing Company for four 25,000-kva. 220/60-kv. transformers, together with six new circuit breakers, type G 22, 187 kv., made expressly for use on a 220-kv. grounded neutral system. Fourteen additional circuit breakers of the same type have been ordered for other locations on the Vincent line.

At present there is no 220-kv. switching equipment in the substation, the 220-kv. lines passing through auto transformers — 220/150-kv. — without switch connection. With the installation of the new circuit breakers it will be possible to do any switching necessary on the 220-kv. circuits.

Electrola, New Talking Machine, Announced by Victor Co.

How electrical research in one industry may affect the development of an allied industry is illustrated strikingly by the perfection of a talking machine utilizing the principle of vacuum-tube amplification that has just been announced by the Victor Talking Machine Company, Camden, N. J. The new instrument, which is to be placed on the market by the Victor company as the Electrola, uses the disc record, but instead of amplification of sound through a diaphragm and horn the sound waves taken from the record are converted into pulsating currents, which are amplified through an audio amplifier in the same manner as are radio impulses.

In announcing the Electrola, the Victor company states that it was developed as a result of simultaneous experiments by the Radio Corporation of America, the General Electric Company and the Westinghouse Electric & Manufacturing Company. Its outstanding characteristic is announced to be the reproduction of a range of frequencies far beyond anything known

Pit 4 Diversion Dam and Intake to Be Built at Once

Announcement is made by F. A. Leach, Jr., vice-president and general manager of the Pacific Gas and Electric Company, San Francisco, that orders have been approved for the construction of the Pit 4 diversion dam and intake structure. This is the next project in the company's power development program on the Pit River in Shasta County. This diversion dam is to be located about 1½ miles downstream from the Pit 3 power house which was placed in operation July 18 of this year. (Journal of Electricity, Aug. 1, 1925, p. 105.)

Detailed plans and designs for the dam and tunnel intake structure have been completed. The new dam will raise the water level in Pit River 40 ft. and will have a crest length of about 410 ft. A reservoir of 1,550 acre-ft. will be formed by the diversion dam. Water will be backed up to the Pit 3 tailrace. The prime reason for the construction of the diversion dam and intake structure at the present time is to provide an afterbay for Pit 3. With this 1,550 acre-ft. reservoir available it will be possible to "peak" on Pit 3, or operate it in accordance with peak demands and still maintain the required steady flow of the Pit River below the power sites.

Construction of this dam calls for an expenditure of \$1,750,000. Cost of the entire Pit 4 project, exclusive of railroad and transmission lines, is estimated at \$14,500,000. The work approved will be carried on during the winter months, employing a minimum of 300 men.

About ten miles of additional railroad construction, costing \$530,000, will be extended from Pit 3 power house down the Pit River Canyon to the Pit 4 power house site. About 4 miles of this now is completed. The project is the fifth of a series of eight to be built in the Pit River section at a total cost estimated to be in excess of \$100,000,000. Hat Creek 1 and 2 and Pit 1 and 3 plants with a total installed capacity of 175,000 kva., have been completed and now are in operation.

O. W. Peterson, engineer of general construction, and the men who handled the construction of the Pit 3 job under the direction of P. M. Downing, vice-president in charge of electric construction and operation, will be in charge of the construction of the Pit 4 project.

Northwestern Power System is Acquired by Puget Sound

Acquiring about ninety miles of transmission line and other electric light and power property in the Olympic peninsula from the Northwestern Power & Manufacturing Company of Port Angeles, Wash., the Puget Sound Power & Light Company has added Clallam, Jefferson and Kitsap Counties to the fifteen western and central Washington counties in which it already operates, according to a recent official announcement made by W. H. McGrath, vice-president of the company. The total area of the three counties thus added to the company's system is 3,902 sq. miles, and is to be connected with the mainland plants by

means of a submarine cable, the cost of which is estimated at \$360,000.

The property changing hands consists of a transmission line beginning at Port Angeles and extending through Sequim to Bremerton Junction, about seven miles southwest of Port Townsend. From this point a branch line goes to Port Townsend while the main line continues south, crossing Hoods Canal at Port Gamble and passing through Poulsbo and Keyport to Bremerton. Possession of the property will be taken by the Puget Sound Power & Light Company Dec. 1.

The transaction does not include the hydroelectric plant of the Northwestern company situated on the Elwha River, which has been supplying power to all points along the transmission line described. Under the purchase agreement the Northwestern company will continue to supply power from the Elwha plant until such time as the Puget Sound company shall have completed its submarine cable connection with the mainland plants.

The towns of Port Angeles, Sequim, Silverdale, Poulsbo and the North Pacific Public Service Company supplying Bremerton, which hitherto have been wholesale customers of the Northwestern company will, after Dec. 1, be wholesale customers of the Western Washington Power Company, a subsidiary of the Puget Sound Power & Light Company.

Additional Generating Equipment for Valmont Steam Plant

An order has been placed by Henry L. Doherty & Company with the General Electric Company for additional generating equipment to be installed in the new Valmont plant of the Public Service Company of Colorado, near Boulder. The initial order covers the complete turbo-generator rated at 25,000 kw. Condenser orders have been placed with the Wheeler Condensing & Engineering Company. Switchboard and cooler orders have not been placed yet.

The construction of the present boiler house and turbine rooms is considered adequate to house the new equipment, according to engineers of the company. With the new equipment the plant will have a capacity of 45,000 kw.

Mount Baker Development Company Applies for Rights on Bagley Creek.—Predicting intention of the Mount Baker Development Company of Bellingham, Wash., to proceed at once with development of its contemplated power project on Bagley Creek, tributary to the North Fork of the Nooksack River in Whatcom County, B. M. Huntoon, manager of the Bellingham concern, has applied to the Washington state supervisor of hydraulics for permission to build a \$5,000 reservoir on Bagley Creek for storage of 100 acre-ft. of water for power purposes. Construction of the reservoir, according to the application, is to begin by July 1, 1926, and is to be finished by Nov. 1, 1927. The Mount Baker Development Company filed its original application, which called for the appropriation of 20 sec.ft. of water from Bagley Creek for power purposes on Oct. 16, 1924. The project proposed to develop 600 hp. at a 350-ft. head. The estimated cost of the project was given as \$50,000.

Power and Irrigation Project Contemplated by California Farmers.—Formation of an irrigation district in Placer County, Calif., was discussed recently at a meeting held at Lincoln. Land owners will be interviewed to get their stand on plans which provide for the irrigation of 50,000 acres of land. The plan is similar to that followed by the Oakdale and South San Joaquin Irrigation Districts in cooperation with the Pacific Gas and Electric Company whereby the later develops power from water supplied by the irrigationists and later returned to them. (Journal of Electricity, June 15, 1925, p. 602.) A dam would be built across Bear River and the water brought through the Pacific Gas and Electric Company's ditch to its Wise power house. Plans call for the erection of a power house about four miles below the Wise plant. An effort would be made to sell the energy to the Pacific Gas and Electric Company.

A. I. E. E. News

Three Lectures to Be Delivered by Illuminating Engineer.—Miss Beatrice Irwin, illuminating engineer, Associate in Arts of Oxford University, England, and inventor of the Irwin Color Filter System of Illumination, will deliver three lectures at the Fairmont Hotel, San Francisco, on Nov. 24, Dec. 1 and Dec. 8, respectively, at 815 p.m. The subject of the first lecture is announced as "Color Science and Psychology (Its Application to Decoration and Illumination)"; the second, "Art, Industry and Illumination in Europe"; and the third, "Morocco, Ancient and Modern." The first and third lectures will be illustrated.

San Francisco Section will hold its next meeting in the new home of the Pacific Telephone & Telegraph Company at 140 New Montgomery Street, as the guests of the telephone company. The speaker of the evening will be C. W. Burkett, consulting engineer for the telephone company, who will discuss the many interesting electrical and structural features of the new building. The exact date has not yet been settled upon, but will be early in December.

Vancouver, (B. C.) Section announces its next meeting for Dec. 1. The subject to be presented is "Developments in Radio Communication." The speaker is to be H. Vickers, Ph. D., M. Eng., M. Sc., professor of electrical engineering at the University of British Columbia. The place of meeting is not yet settled.

Denver Section will hold its regular meeting Friday, Nov. 20, at the Elks' Club. As usual, dinner will be served at 6:15 p.m. preceding the session. "A Review of the Epoch-Making Scientific Advances Within the Last Hundred Years" will be the subject upon which B. F. Howard, electrical engineer of the Mountain States Telephone & Telegraph Company, will speak.



News of the Electragists



Fundy's Electric Shop, formerly located at 526 Third Street, San Bernardino, has moved into a new store at 390 E Street, where it will have additional floor space.

Claude Bourbon, San Diego contractor, recently was awarded a contract by the Navy for the construction of an 11,000-volt fiber duct-line at the Chollas Heights high-powered naval radio station.

Clyde L. Chamblin of San Francisco has returned from a trip to Chicago where he attended the executive committee meeting of the National Electric Light Association. Mr. Chamblin represents the electragists on this committee.

Correcting an Error.—The stock of the Poindexter Electric Company of Denver, Colo., was not sold to G. A. Sechler, a contractor-dealer of that city, on a court order following the death of Mr. Poindexter, as reported in the Oct. 15 issue of the Journal of Electricity. The Poindexter Electric Company is a corporation composed of four partners, of which Mrs. Poindexter is the largest stockholder. The business is to be continued as a jobbing and wholesale business on the same basis as when conducted by Mr. Poindexter.



J. C. Hobrecht, electragist of Sacramento, came into prominence as a golfer in the qualifying round of the city amateur golf championship held at the Del Paso Country Club course when he made a hole in one. A perfect mashie niblick tee shot struck on the green and rolled gently into the cup on the 123-yd. eleventh hole.

Bakersfield Contractors Are All Members of Association

Every electrical contractor in Bakersfield, Calif., is a member of the Electric Contractors Security Alliance of Bakersfield. This is a remarkable record, especially in view of the fact



Samuel Fingerhut, secretary-treasurer of the Electric Contractors Security Alliance of Bakersfield. He is proprietor of the Acme Electric Company.

that there are twelve electrical contractors in this city with a population of less than 25,000 people.

Samuel Fingerhut of the Acme Electric Company has been very active in the organization since its inception, and its success has been due largely to his efforts as its secretary-treasurer. Other officers are: president—L. C. Stoll, L. C. Stoll Electric Shop; and vice-president—Max Klunder.

J. B. Sunny, of the Sunny Electric Shop, has opened a new store at 124 East I Street, Colton, Calif.

J. F. Edwards, formerly chief electrician at the Oro Grande plant of the Golden State Portland Cement Company, has opened the Victorville Electric Company at Victorville, Calif. He will specialize in industrial installations.

P.C.E.A. News

P.C.E.A. Technical Section Men Attend Detroit Meeting

Full co-operation between the Technical Section, P.C.E.A., and the Technical National Section, N.E.L.A., is to continue as one of the strong features of the activities of the local section.

Toward this end seven representatives of the P.C.E.A. attended the group meetings in Detroit, Oct. 6-9. Those making the trip East for this purpose were R. R. Cowles, chairman of the Technical Section; H. L. Doolittle, past chairman and a member of the executive committee; J. W. Andree, chairman of the prime movers committee; P. E. Chapman, chairman of the Underground systems committee; Walter Dreyer, chairman of the hydraulic power committee; W. R. Frampton, chairman of the safety rules committee; and G. A. Riley, chairman of the overhead systems committee.

Outline of Activities of Prime Movers National Section

By J. W. ANDREE, Chairman Prime Movers Committee, P.C.E.A.

All geographic chairmen made reports of the activities of their respective sections. Final reports on the following subjects were read, discussed, accepted and ordered printed for distribution:

- Stacks and Flues
- Boiler and Turbine Room Instruments
- Burning of Liquid and Gaseous Fuels
- Operating Code Manual and Personnel
- Preliminary Reports were made on the following subjects:
 - Oil and Gas Engines
 - Coal and Ash Handling
 - Higher Steam Pressures and Temperatures
 - Boilers, Superheaters and Economizers
 - Specifications
 - Distillation Products of Coal.

From round-table discussions the following conclusions were drawn:

The probability of the necessity of burning crude oil residuum as a power-plant fuel is so remote that at the present time it need not be considered seriously.

With the present stage of development of power-plant material steam temperatures exceeding 750 deg. F. are not advisable, and where pressures exceeding 400 lb. are used reheating of the steam should be resorted to.

For steam pressures in excess of 500 lb., electric welding of joints is preferable to acetylene welding. Tongue-and-groove joints with metallic gaskets are giving satisfaction. Corrugated monel-metal gaskets also are giving satisfaction; however, some of the committee members were of the opinion that monel metal is too hard for gaskets. By-pass valves should be attached to the pipe at each side of the valve rather than to the body of the valve as the latter practice may cause leakage due to unequal expansion.

Caustic embrittlement of boiler drums may be avoided by caulking drum seams on the inside instead of on the outside. Water in the boiler should be watched closely and the concentration should not be less than 3 to 1, sulphates to carbonates.

After adjournment the prime movers committee in a body visited the 150,000-kw. Trenton Channel power plant of the Detroit Edison Company.

Meetings

Women's Organization Formed in Puget Sound Company

With a comprehensive program to follow a course of activity based on six definite purposes, the women employees of the Puget Sound Power & Light Company, Seattle, recently organized themselves into "The Women's Co-operative Association" of the company. These purposes, as adopted by resolution at the initial meeting of the organization last month in Seattle, are:

To provide a better opportunity for advancement of women employees and prepare them for greater responsibilities; to stimulate interest in the company's problems; to acquire and disseminate information concerning the problems and policies of the company; to educate in public speaking; to co-ordinate the work of women employees with that of the entire organization; to provide means for vocational education as a means of advancement.

The meeting, which consumed three sessions on two successive days, was attended by representatives from each of the six districts of the company, who will act as chairmen of their respective "district councils," through which the main organization will function. These district representatives were: central district—Nellie Duffy, Seattle; southern district—Bertie Neill, Vancouver, Wash.; eastern district—Doris Fennell, Wenatchee, Wash.; northern district—Mrs. Alice Harris, Bellingham, Wash.; northeastern district—Mrs. Hazel Redward, Everett, Wash.; southwestern district—Lois Cross, Tacoma.

The first session was opened by Col. H. G. Winsor, personnel officer, and later turned over to Miss Duffy after her election as chairman. Mabel Hall was chosen secretary. During the other sessions the meeting was addressed by W. H. McGrath, vice-president, and by Norwood W. Brockett, director of public relations. The newly formed organization will co-operate with the Women's Committee of the Northwest Electric Light and Power Association.

New Officers to Head Electric Transportation Association

Officers of the Electric Transportation Association for the ensuing year were elected at a recent meeting of that organization in San Francisco. The following are the new officials: H. A. Fore, Philadelphia Storage Battery Company, president; Arthur Walthe, Autocar Sales and Service Company, vice-president; H. H. Singletary, Pacific Gas and Electric Company, secretary-treasurer; and W. J. Walsh, assistant secretary-treasurer.

A report was received from the committee on co-operative advertising. An outline of their recommendations will be sent to all members of the organization, and it is hoped that a definite decision will be reached at the next meeting.

Colorado League Has New Name and Emblem

With the change in name to the Electrical League of Colorado effective Nov. 1, officers of the old Electrical Co-operative League in Denver have changed everything bearing the old name, including the league emblem, which has been revised to indicate one of the new tipless lamps instead of the old clear type with visible fila-



New emblem adopted by the Electrical League of Colorado in a recent decision.

ment. Official announcement of the change in name has been made to the industry (Journal of Electricity, Oct. 1, p. 261), and it is understood that a number of outlying communities are interested in being identified with the league movement. Membership in the league already includes all of the suburban central stations, in addition to the Public Service Company of Colorado. Headquarters will be continued at 402-403 Gas & Electric Building in Denver under the direction of S. W. Bishop.

COMING EVENTS

Publicity Section, Pacific Coast Electrical Association—

Palace Hotel, San Francisco,

Nov. 19, 1925

Executive Committee, Pacific Coast Electrical Association—

Office of the Secretary, San Francisco,

Nov. 20, 1925

Commercial Section, Pacific Coast Electrical Association—

San Francisco,

Nov. 19-20, 1925

California Electrical Bureau—

Executive Committee Meeting, San Francisco

Nov. 19, 1925

California Electragnists, Northern Division—

Quarterly meeting at Sacramento,

Dec. 5, 1925.

National Association of Railroad and Utilities Commissioners—

Kansas City, Baltimore Hotel

Feb. 9-12, 1926

S. F. Illuminating Engineers Name Officers

S. P. Russell, manager, H. B. Squires Company, was elected unanimously chairman for the new fiscal year of the San Francisco Bay Cities Chapter of the Illuminating Engineering Society at its meeting Oct. 26. He succeeds J. R. Cravath, consulting illuminating engineer, in the leadership of the chapter, having presided over the chapter during the latter's recent trip East.

Other officers named at this meeting were: L. F. Leury, consulting engineer, vice-chairman; C. D. Montieth, lighting sales engineer, Pacific Gas and Electric Company, secretary and treasurer; and on the board of managers: J. R. Cravath, retiring chairman; Dr. Percival Dollman, Optometrist; Miles F. Steel, Benjamin Electric Manufacturing Company; Clark Baker, National Lamp Works of the General Electric Company, and G. M. Simonson, Simonson & St. John, consulting engineers.

Book Reviews

GENERATOR AND MOTOR EXAMPLES

By PROF. F. E. AUSTIN, E.E., Hanover, N. H., author of "Induction Coils In Theory and Practice," "Preliminary Mathematics," "Examples In Magnetism," "Examples In Battery Engineering," "Examples In Alternating Currents," "How To Make Low-Pressure Transformers," "How To Make High-Pressure Transformers," "Laboratory Experiments With Direct Currents," "How To Make Telephones"; published by the author; 106 pages; 4 reference tables; 48 illustrations.

This is a practical little 106-page book dealing with the development of equations for the various efficiencies of electrical machinery. Consideration of motors and generators in their various types divides the book into two parts. While not intended as an elementary treatise, this book goes into the fundamental principles of dynamos sufficiently to give a clear understanding of the development of equations that is given in the text.

A short discussion of the theory of generators illustrated with problems opens the book. From this the text goes to the classification of generators and the development of equations for the efficiency of conversion, the electrical efficiency and the commercial efficiency of this type of machine. Enlarging upon this the author develops the equations of maximum output, and armature current and load resistance for highest efficiency. The all-day efficiency under various conditions is illustrated by problems.

The theory of the motor next is taken up. The equation for counter e.m.f. is developed and its relation to efficiency illustrated. After dealing with the efficiencies of a motor, the method of rating second-hand motors is shown.

Operating costs, financial efficiency and all-day efficiency are considered with regard to their practical applications.

This book should be of value to repair men in rebuilding machinery for new ratings. Designers and plant engineers should find it useful in calculating the size of individual units to be used in initial installation and the ultimate load for economical operation.

The text is couched in simple language, and each development well illustrated by one or more easily understood problems. All mathematical expressions used, with the exception of one or two developments in calculus, can be followed easily by the average practical worker. K.A.K.

Publication of Report on Oil Resources of United States Announced.—"American Petroleum: Supply and Demand" is a report of the country-wide survey made of the oil resources of the United States. The major factors of the investigation dealt with the future supply of petroleum and the future demand of the country for petroleum products in times of peace and war. The report was made by the Committee of Eleven of the American Petroleum Institute and published by the McGraw-Hill Book Company, Inc., New York.

Personals

E. H. Coe, vice-president and general manager of the Central Arizona Light & Power Company, Phoenix, has made rapid progress in the central station branch of the industry. In the fourteen years since his graduation from Stevens Institute of Technology, Hoboken, N. J., in 1911 he has spent a year with the Edison Lamp Works of the General Electric Company, Harrison, N. J., four years with the Niagara Lockport & Ontario Power Company, Buffalo, seven years with the Colorado Power Company, Denver—since 1923 as sales manager—and six months as assistant to the general superintendent of the Public Service Company, which acquired the former company in September, 1924. In February of this year Mr. Coe went to Arizona to join the Central Arizona Light & Power Company and the following June was promoted to the position he now holds.

J. B. Black, vice-president and general manager, Great Western Power Company of California, San Francisco, lately returned from an extended Eastern trip.

E. M. Hamilton, of Hamilton, Beauchamp & Woodworth, metallurgical engineers, San Francisco, has returned from Europe after an absence of four months and a half.

Sir Thomas O. Callender, more generally known in the electrical world as "Sir Tom," managing director of Callender's Cable & Construction Company, Ltd., of London, accompanied by Lady Callender and their son, has arrived for a visit in this country after an absence of some years. In addition to inspecting some of the most recent of the superpower plants in this country, including those established by his old friend, **Samuel Insull**, president, Commonwealth Edison Company, Chicago, he will inspect the recently established super-tension paper cable plant of the Okonite-Callender Cable Company at Paterson, N. J., in which his company is interested jointly with the Okonite company.

Arthur H. Halloran, publisher of Radio, San Francisco, has been elected president of the Pacific Radio Trade Association, succeeding **H. E. Metcalf**. He will serve also as chairman of the board of directors, made up of the following: **A. H. Rowe**, representing manufacturers; **J. P. Hermans**, manufacturers' agents; **C. R. Musladin**, electrical jobbers; **Ernest Ingold**, radio jobbers; **W. H. Jackson**, miscellaneous jobbers; **Clyde L. Chamblin**, electrical dealers; **J. B. Threlkeld**, radio dealers; and **R. D. Eastman**, miscellaneous dealers. **Mrs. E. H. Gray** was reappointed secretary.

E. J. Rosenauer, Western district auditor for the Byllesby Engineering & Management Corporation, spent a week with the San Diego Consolidated Gas & Electric Company, San Diego, Calif., a short while ago.

C. R. Hunt of San Francisco, Western representative of Robbins & Myers, was in Los Angeles on business recently.

Samuel Kahn, for the past twelve years vice-president and general manager of the Western States Gas & Electric Company, Stockton, Calif., a Byllesby property, has been made vice-president and general manager of the Market Street Railway Company, San Francisco, also controlled by **H. M. Byllesby & Company**. He has resigned as general manager of the Stockton company but will retain the vice-presidency and also will serve on the board of directors. Mr. Kahn's experience in the utility field has been wide. In the ten years between his graduation from Purdue University in 1903 and his joining the organization of the Western States company in 1913, he was connected with the San Antonio



SAMUEL KAHN

Gas & Electric Company, the San Antonio Traction Company, the Union Light, Heat & Power Company of Fargo, N. D., the Appalachian Power Company of West Virginia, and the Tacoma Gas Company, Tacoma, Wash. In addition to the offices mentioned, Mr. Kahn is a director of the Standard Gas & Electric Company, a Byllesby holding company, and vice-president of the Sierra & San Francisco Power Company, under lease to the Pacific Gas and Electric Company. In Stockton he was exceedingly active in community affairs, having been president of the Chamber of Commerce, a director for a number of years and chairman of its deep waterway committee, and a director of the Stockton Savings & Loan Bank. He is a native of San Antonio, Texas.

L. J. Brown has been appointed stores manager for the Western Electric Company in San Francisco.

Carl J. Erickson, vice-president and sales manager, Wells Manufacturing Company, San Francisco, who made a tour of the country in the interests of his concern, has returned.

E. D. Stewart has been made branch manager of the El Paso office of the Westinghouse Electric & Manufacturing Company that recently was consolidated with the office at Phoenix, Ariz. **W. G. Wilson** has been appointed local manager at Phoenix under Mr. Stewart's supervision.

J. H. Knost, formerly branch manager of the Westinghouse Electric & Manufacturing Company's office at Phoenix, Ariz., has been made industrial and power sales engineer for the Los Angeles district, with headquarters in Los Angeles.

A. H. Ellerman has joined the staff of the Wagner Electric Corporation at Kansas City, Mo.

Charles A. Semrad, vice-president and general commercial manager of the Public Service Company of Colorado and president of the Rocky Mountain Division, N.E.L.A., attended the national executive committee meeting of the N.E.L.A. in Chicago not long ago. **William C. Sterne**, head of the Municipal Properties Investing Company in Denver and chairman of the Rocky Mountain Information Committee, attended the meeting of the Public Relations Section of the N.E.L.A. at the same time. He was accompanied by his son **Charles Sterne**. Following the meetings they visited in Indianapolis, New York City and Washington.

A. L. Day, formerly line foreman at Hood River, Ore., for the Pacific Power & Light Company, Portland, has been appointed rural electric service man for that company in the same and contiguous districts. This is a newly created position in the commercial department of the company, and will embody work covering public relations and sales among rural customers and also the estimating of rural extensions.

C. J. Kruse, for some time a line-man at Hood River, Ore., for the Pacific Power & Light Company, Portland, has been promoted to be line foreman at that district, taking the place of **A. L. Day**, who has joined the commercial department of the company.

Joseph Moorehead, assistant director of publicity of the Mountain States Telephone & Telegraph Company, was named as one of the team captains in the annual membership drive of the Denver Y.M.C.A.

C. M. Brewer, in addition to his positions as vice-president and general manager of the Mountain States Power Company, Tacoma, and as director on the board of the Standard Gas & Electric Company, Chicago, has been appointed vice-president and general manager of the Tacoma Gas & Fuel Company, succeeding **D. J. Young**, who remains in consulting capacity on the staff of the Byllesby Engineering & Management Corporation.

H. L. Bargion, representative of the Washington Electric Supply Company, Spokane, recently visited San Francisco.

R. A. Hopkins, until recently manager of the engineering division in the Westinghouse Electric & Manufacturing Company's Los Angeles district, is now central station division manager. **J. C. Jones** has been appointed assistant manager of the central station division.

H. F. Hendrickson, office manager for Stone & Webster, Inc., has returned from the Baker River development in Washington to the Los Angeles office in connection with the addition to the Southern California Edison Company's Long Beach steam plant.

H. E. Sherman, vice-president and sales manager, Illinois Electric Company, and **J. H. Jamison**, merchandising manager, Westinghouse Electric & Manufacturing Company, lately made an extended business trip through Arizona.

A. T. Richardson, for some time connected with the Wholesale Electric Company, San Francisco, has joined the staff of Birkel & Le Gassic, Santa Monica, Calif., as office manager.

James Eakins, formerly a commercial representative for the Public Service Company of Colorado, Denver, has been placed in charge of the newly organized radio department of that company.

L. L. Hennessy, superintendent of the order department, San Diego Consolidated Gas & Electric Company, won the silver cup at the Chula Vista Country Club golf tournament recently for the third successive time.

A. E. Holloway, superintendent of commercial department, San Diego Consolidated Gas & Electric Company, and president of the Chamber of Commerce of that city, attended the October meeting of the Southern California Regional Advisory Council, California Development Association in Pasadena. Mr. Holloway, who is chairman of the industrial committee of the latter organization, also attended the recent meeting of the Southern California Regional Cotton Conference at Riverside.

L. M. Cargo, manager Westinghouse Electric & Manufacturing Company, Denver, in October last completed thirty-seven years service with that company. **A. C. Cornell**, Western Electric Company manager in Denver and chairman of the Electrical League of Colorado, and **A. T. Slack**, one of the company's salesmen, were awarded twenty-year service buttons by that company.

G. H. P. Dellman, lighting sales engineer of the new business department, San Diego Consolidated Gas & Electric Company, attended the meeting of the Commercial Section executive committee, P.C.E.A., in San Francisco recently.

C. H. Robbins recently was selected as manager of the new electrical appliance department of Holzwasser, Inc., a large department store of San Diego, Calif. Mr. Robbins was formerly with the Hurley Machine Company as manager of its Thor Shop in Los Angeles.

L. J. Pospisil, **E. H. Collins** and **L. R. Gamble** of the engineering department, The Washington Water Power Company, Spokane, attended the recent A.I.E.E. meeting at Seattle.

H. S. Emanuels, of Fairbanks-Morse Company, **J. S. Davis**, chief engineer, Olympic Hotel, and **S. C. Lindsay**, engineer, Puget Sound Power & Light Company, recently became members of the Seattle Electric Club.

D. W. Chamberlain, of the Globe Electric Company, has been named treasurer of the Seattle Electric Club, succeeding **E. A. Irons**, of the Westinghouse Lamp Company, who recently resigned.

John F. Greenawalt, publicity director, Mountain States Telephone & Telegraph Company, served as chairman of the publicity committee of the recent drive conducted in Denver for the financing of the Sunshine Mission.

O. L. Mackell, chief clerk, Public Service Company of Colorado in Denver, had radio loud speakers installed in the company offices during the world series baseball games so that returns might be heard by customers and employees.

L. J. Bridger, Westinghouse lamp representative in the Mountain region, attended a company conference in St. Louis early in October and later visited one of the company factories in Milwaukee before returning to his headquarters in Denver.

A. F. Morairty, formerly assistant to the general superintendent of the Public Service Company of Colorado, Denver, has become commercial manager of the Central Arizona Light & Power Company, Phoenix. This is Mr. Morairty's second promotion in less than a year, for it was only about six months previous to his appointment to his present position that he was made assistant to the general superintendent of the Public Service Company. Prior to that he had been district manager for that company at Alamosa, Colo. He started his career in plant construction work with the Colorado Power Company, predecessor of the Public Service Company; he has been substation operator, steam plant



A. F. MORAIRTY

operator, system dispatcher, assistant local manager, local manager and district manager. Mr. Morairty always has taken an active part in the affairs of the electrical industry, particularly in N.E.L.A. work, and has played a prominent role in community and organizational activities such as those connected with social and welfare work and with the Chamber of Commerce, Rotary Club and the Boy Scouts. He was born in Boulder, Colo., in 1888, receiving his grade and high-school education in Denver and the degree of electrical engineer from the University of Michigan.

R. L. Hearn of the consulting firm of Acres & Hearn, Niagara Falls, Ontario, accompanied by Mrs. Hearn, visited Spokane and other points in the vicinity a short time ago. Until last spring Mr. Hearn was assistant chief engineer of The Washington Water Power Company, Spokane.

E. G. Moser, formerly chief operator at the Kalama River plant of the Puget Sound Power & Light Company, Seattle, has been transferred to the company's Baker River plant; **R. Morrow**, second shift operator at the Kalama River plant has been transferred to the Snoqualmie Falls plant, and **E. G. Teagarden**, formerly third shift operator, has been made chief operator at the Kalama plant.

Patrick Haffey, a member of the contract department staff of the Public Service Company of Colorado in Denver, received considerable publicity in the newspapers early in October when he was left a legacy by a wealthy St. Louis druggist with whom he was acquainted.

F. F. McCammon, manager of the power sales department of the Public Service Company of Colorado, represented **Clare N. Stannard**, vice-president and general manager of the company, and gave the address prepared by Mr. Stannard on "The Relation of Electricity to Agriculture" over KOA, General Electric broadcasting station in Denver when "Electric Night" was celebrated Oct. 21. **H. S. Robertson**, general manager of the Denver Tramway Company, also made an address. **Guy B. Hopkins** directed the Public Service Company band in a number of musical selections on the program.

Lars Langloe, reclamation engineer in the state department of conservation and development at Olympia, Wash., has resigned to take charge of reclamation development for the River-view Farm Corporation of Seattle on Blalock Island in the Columbia River, near Patterson. Mr. Langloe has been with the department since 1921. His duties will be temporarily handled by **R. K. Tiffany**, supervisor of hydraulics.

G. H. P. Dellman, lighting sales engineer of the new business department, San Diego Consolidated Gas & Electric Company, San Diego, Calif., attended the recent Los Angeles meeting of the industrial lighting committee, N.E.L.A.

R. B. Bonney, chairman of the speakers bureau, and **George E. Lewis**, executive manager of the Rocky Mountain Committee on Public Utility Information, have organized the class in public speaking for utility employees in Denver. The class will continue for twenty weeks, one night weekly, under the tutorage of Prof. Bertrand Lyon.

Obituary

Roy Castle Greenfield, mining and mechanical engineer, for many years connected with the Allis-Chalmers Manufacturing Company, both in the United States and Mexico, died in Chicago, Oct. 28, after an illness of about two years.

Rush B. Morrow, engineer in the light and power department of the Portland Electric Power Company, died Oct. 4, 1925, after an illness lasting several months. He was born Feb. 29, 1884. During the war he saw eight months active service as a captain in the 37th Engineers, later having been promoted to the rank of major. He had been with the Portland company since 1920.

Stacy Hamilton, for some years assistant to the president of the Portland Electric Company, Portland, with the title of organization inspector, died Oct. 1, 1925, from a nervous disorder resulting in a species of paralysis. He had been ill some months. Born Jan. 21, 1886, he spent his boyhood in San Francisco and was at one time employed by the Western Electric Company there. In 1907 he went to Portland and took a position in the light and power department of the organization then known as the Portland Railway, Light & Power Company, being occupied with rate studies and statistical records. In 1920 he was transferred to the office of the president.

TRADE NOTES

The Pacific Electric Manufacturing Company, 5815 Third Street, San Francisco, has announced the opening of a Chicago office at 1001 McCormick Building, with G. B. Kirkwood in charge. The company makes a full line of high-tension equipment, including disconnecting switches, oil circuit breakers, high-voltage fuses and the like.

The Empire Lighting Fixture Company, Los Angeles, has announced the opening of a display room at Pasadena, Calif., in charge of J. J. May, resident manager. The company will continue to maintain its present showrooms at Los Angeles, Hollywood and Glendale.

The Easy Housekeeping Shop, Inc., Los Angeles, distributors of Easy washing machines, issues a monthly sales bulletin, "Easy Money—Breezy Notes for 'Easy' Salesmen," a four-page, mimeographed pamphlet, which is proving to be an excellent method of increasing monthly sales quotas.

Imperial Molded Products Corporation, Chicago, recently has been formed and will be controlled and financed by officers of the Imperial Brass Manufacturing Company. A large modern factory has been taken over by the new corporation for the production of molded Bakelite parts by high-pressure steam.

Harold E. Trent, Philadelphia, has produced a wide-tip soldering iron, designed to meet extreme requirements where a soldering iron is necessary for heavy work. It is made in two types, a spear shape and hatchet type.

Philadelphia Storage Battery Company, Philadelphia, now is occupying its new five-story concrete addition to its plant to provide facilities for the manufacture of its new product, Philco radio "A" and "B" socket powers.

The Brown Instrument Company, Philadelphia, has issued bulletin 1-13 illustrating and describing the Brown new design recording pyrometers.

The Hisey-Wolf Machine Company, Cincinnati, has issued bulletin No. 108, which describes the latest Hisey $\frac{3}{8}$ -in. capacity standard duty universal electric drill.

Kelvinator Corporation, Detroit, has developed a new ice cream electric cabinet. Preparations are under way for a large scale of production, a new factory having been equipped for handling the production.

Pyle-National Company, Chicago, has introduced a new floodlight projector design under type No. 2375 that is the latest addition to a complete line of cast aluminum floodlighting and locomotive headlight products.

The Esterline-Angus Company, Indianapolis, has issued a folder which is descriptive and illustrative of its "twin-type" meter.

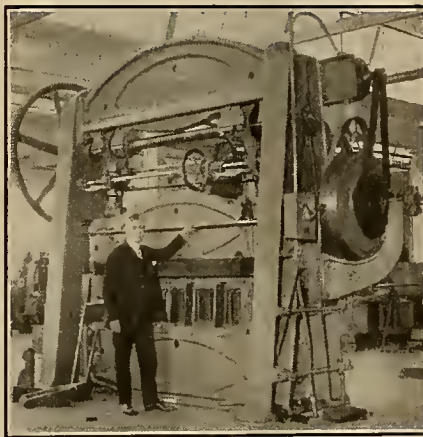
Bryant Electric Company, Bridgeport, Conn., has placed on the market No. 2957, a new combination "Spartan" outlet and tumbler switch. The device is similar to the familiar No. 117, but has a tumbler switch in place of the type "O" mechanism which the older type employed.

Harvey Hubbell, Inc., Bridgeport, Conn., has put on the market a new 30-amp. polarized flush receptacle.

Albert and J. M. Anderson Manufacturing Company, Boston, has issued bulletin No. 38, which is fully descriptive of the Anderson charging plugs and receptacles. The catalog also contains a full price list.

Groundulet Company, Newark, N. J., has made some new developments in its groundulet system, that it is claimed fulfill all requirements of the 1925 National Electrical Code. The same is described fully in the company's literature which may be obtained on request.

The Okonite Company, Paterson, N. J., has issued a new booklet entitled "The Story of Steel Taped Cable." The booklet is well illustrated with photographs.



A. E. Griswold, president of the A. G. Manufacturing Company of Seattle, as caught in unofficial pose by the inquisitive photographer. At first glance it might seem that Mr. Griswold is exhibiting apprehension at the possible souvenir-collecting propensities of the intruder and that he is hanging on to his pet plaything to prevent its being collected. Or it might be the "proud papa" instinct showing forth.

Delta-Star Electric Company, Chicago, has issued a 48-page bulletin containing complete descriptions and diagrams of its standardized unit-type bus-bar supports for standard, heavy-duty and extra heavy-duty service.

General Electric Company, Schenectady, has issued Bulletin KEK-10 on "Electric Railways and the American Public", which contains a collection of recent and forthcoming advertisements explaining the electric railways and their functions.

National Manufacturers Agencies, 1161 Market Street, San Francisco, has produced a new feature in electric waffle irons, known as the International automatic waffle baker, which contains a simple timing device that regulates automatically the length of time the waffle bakes. At the end of that time the top of baker automatically opens, which prevents burning and avoids the continual lifting up of the top to see if waffle is done.

The Cutler-Hammer Manufacturing Company, Milwaukee, has developed a new attachment plug which is said to incorporate several features of design and construction.

Edison Electric Appliance Company, Inc., Chicago, has placed several new percolator models on the market that are described and illustrated in their new catalog supplement No. A585.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, has produced a new combination disconnecting switch, fuse and choke coil, designed to reduce the size and weight of the combined unit as well as the number of insulators required for a given installation.

Killark Electric Manufacturing Company, St. Louis, is constructing a new factory building at 3940 Easton Avenue, which will cover 25,000 sq. ft. The new building is expected to be completed in January, 1926.

Brammer Washing Machine Company, Davenport, Iowa, successor to the White Lily Manufacturing Company and the H. F. Brammer Manufacturing Company, recently has started deliveries on its new washing machine, the "White Lily Ace" No. E 40 C, which it is claimed is a radical departure from anything previously marketed by either of the former companies.

The Western Electric Company office in Denver has been moved from 1425 Curtis Street to 18th and Blake Streets where a building has been converted for office and warehouse usage. The new location is in the wholesale district and has trackage facilities. Special stock arrangements at the new location will provide unusual counter service for Denver wholesale trade. The electrical layout of the new building, it is understood, is complete in every respect. A. C. Cornell is the Rocky Mountain district manager of the company.

Uehling Instrument Company, Paterson, N. J., has issued bulletins 118 and 118-A describing the Apex CO₂ recorder and indicator. These instruments operate on the orifice principle and do not employ chemical solutions. The principle of operation is fully explained in the bulletins.

The Reliance Electric & Engineering Company, Cleveland, has issued bulletin No. 4000 giving information on ball and roller bearing reliance motors. The bulletin is well illustrated with photographs.

The Trico Fuse Manufacturing Company, Milwaukee, has added the new giant fuse puller and replacer to its present model, the pocket-size tool. This new giant size model is described and illustrated fully in the literature the company will mail upon request.

The G. L. Halek Sales Company has been appointed the California, Oregon and Washington representative for the Kant-Break Ladders, Inc., St. Louis, Mo. The company manufactures a line of electrician's, linemen's and general type ladders.

The Electric Supply Company of Oakland, Calif., has opened a branch at 1063 Howard Street, San Francisco. Mel Hirsch has been appointed the manager of the San Francisco branch office.

Electrical Development & Machine Company, Philadelphia, has issued a new folder illustrating and describing its insulating switch and other power equipment.

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES



Installation of OKONITE

"Parkway" Cable

Lead and Steel Taped

for the ornamental lighting around
Lake Merritt, Oakland, California



THE OKONITE COMPANY

OKONITE-CALLENDER CABLE COMPANY, INC.

Factories: PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York · Chicago · Pittsburgh · St. Louis · Atlanta
Birmingham · San Francisco · Los Angeles

Pettingell-Andrew Co., Boston, Mass.

Naval Electric Co., Phila., Pa. F. D. Lawrence Electric Co., Cincinnati, O.

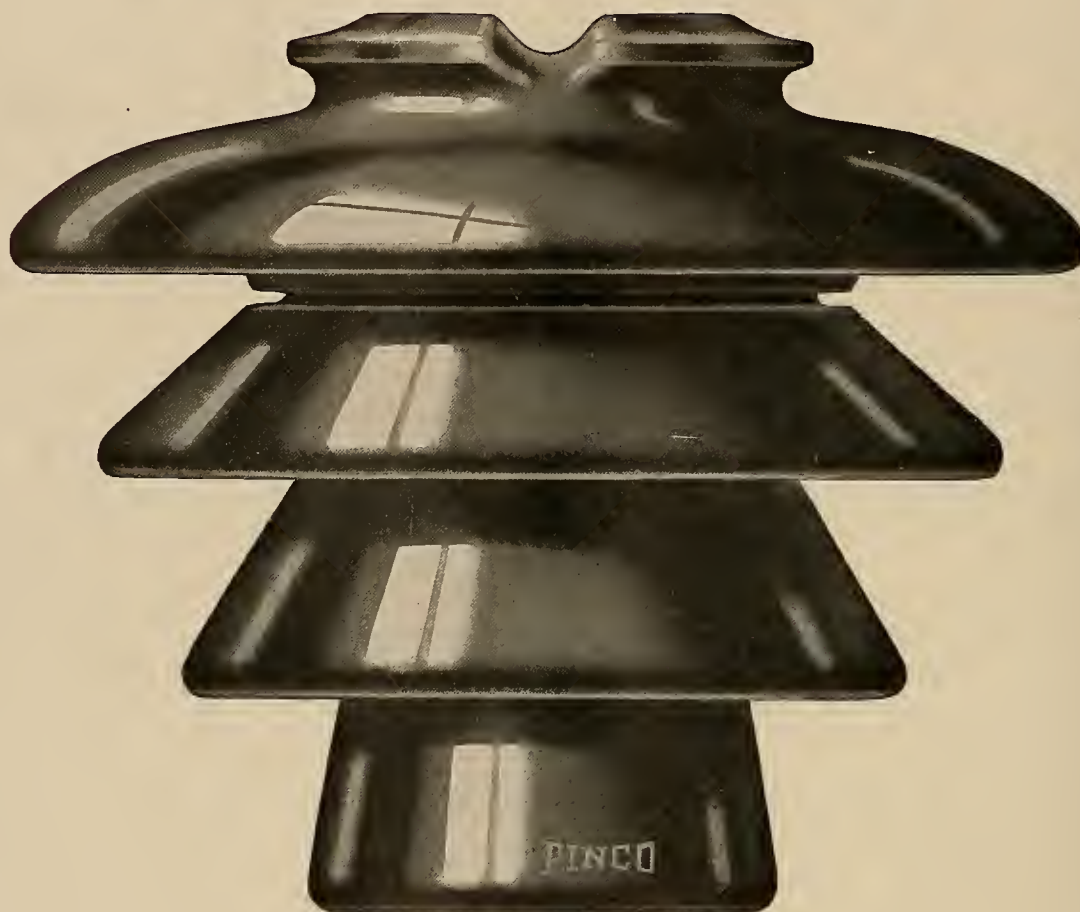
Canadian Representatives: Engineering Materials Limited, Montreal

Cable Re-representatives: Victor G. Mendenhall Co., Havana



P I N C O

"The Correct Design"



No. 265 — 88,000 Volts

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PORCELAIN INSULATOR CORPORATION
LIMA, NEW YORK

Pacific Coast Stocks Carried by
JOBBER'S SUPPLY COMPANY
SEATTLE PORTLAND

—and—

BAKER-JOSLYN COMPANY

DISTRIBUTERS

ELECTRICAL EQUIPMENT AND CONSTRUCTION MATERIALS

SAN FRANCISCO

LOS ANGELES



Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."

Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

Published Semi-Monthly

Established 1887

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R. N. PHELAN, Associate Editor

C. T. HUTCHINSON, Editorial Director
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VOLUME 55

SAN FRANCISCO, DECEMBER 1, 1925

NUMBER 11

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McGraw-Hill Company of California — 883 Mission St. — SAN FRANCISCO
Northwest Office: 1206 Spalding Building, Portland, Ore.

Publishers of JOURNAL OF ELECTRICITY

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WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
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CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation

Printed in U. S. A.

Commercial Possibilities of Floodlighting

FLOODLIGHTING of commercial, industrial and civic buildings is one of the latest developments in illumination. There is hardly a city in the West but what possesses an office building, a factory, a school or other civic building which will not lend itself admirably to this form of lighting. This field affords splendid opportunities for the entire electrical industry. For the manufacturer and jobber there are the profits on the material and equipment; for the contractor there is a sizable wiring job in each case, and for the central station there is a large and highly desirable load. By devoting close study to the subject of floodlighting the industry will not only open the door to new business but will be performing a civic duty, for a properly floodlighted building is a distinct asset to any community.

In this issue three of the most recent floodlighting developments in San Francisco are the topic of a lengthy article which goes into every phase of the subject. We recommend a careful study of this material.

To keep abreast of the times is one of the first requisites of a trade journal, and in presenting discussions of new developments of this character the Journal of Electricity meets this requirement.

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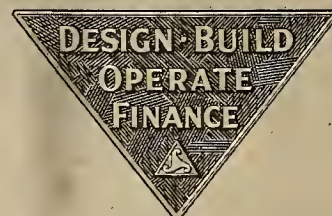
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THE EDISON ELECTRIC ILLUMINATING COMPANY OF BOSTON

STONE & WEBSTER

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EDITORIAL

A Brand of Service Beyond Criticism

PERHAPS no business more fully realizes the truth of the old proverb about the little things that count than that of the public utilities. It is the little things that frequently bring forth well-deserved letters of praise for both an employee and the corporation by which he is employed. This leads us to quote a letter recently received by the Los Angeles Gas and Electric Corporation:

"You will always receive complaints from users of your service, but you do not always receive commendations from those who have been helped when wires cross.

"I would be derelict in courtesy if I did not take the time to write you concerning a little thing one of your employees did that meant much to our comfort.

"Mrs. Barry reported to your office that our lights were off. Your service man arrived in a short time, but Mrs. Barry was not at home. Upon her return she found the lights on, a penciled note, written on the back of a laundry slip, which read as follows:

"'You phoned Los Angeles Gas and Electric for service on lights. We do not supply your light—Los Angeles City does. Bureau of Power and Light, 209 S. Broadway, Metropolitan 4200. However we have fixed trouble.'"

The act of the trouble man in this particular instance in displaying a brand of service beyond criticism is one of the things which makes the work of the public relations department more easy.

The Farmer Dislikes Subsidizing Public Ownership

IN advocating a general program of state tax reduction the California Farm Bureau has proposed two measures of decided importance to the electric light and power industry. The first is the elimination of tax-exempt securities and the second is the taxing of publicly owned utilities. This program has been adopted because the farmers of the state feel that the city dweller rapidly is shifting the cost of government to the shoulders of the residents of rural communities by causing them to pay to the city dweller a subsidy to enable him successfully to operate and own his municipal utilities—electric plants, street car systems and water works.

In a recent issue of one of the Farm Bureau publications it was pointed out that this subsidy amounts to 17.5 cents of every dollar which the farmer pays for electric service, being the total of taxes collected by the state and national govern-

ments from the privately owned utilities, together with the difference in interest rate between public and private bonds. Briefly, this subsidy is made up of a 7.8 per cent direct state tax on gross earnings and a direct tax levied by the federal government against capital stock and incomes that over a period of years has amounted to approximately 2½ per cent of gross earnings. Due to the fact that bonds of publicly owned utilities are tax-exempt while those of privately owned utilities are taxable, there is a differential in interest rates in favor of the tax-exempt securities of approximately 1¼ per cent. Records show that the average capital invested in utilities is approximately six times the gross revenue so this differential of 1¼ per cent really amounts to 7½ per cent of the earnings.

The California farmers are not the only group which would like to see the proposed measures passed. There are thousands of other electric consumers who are being subjected to the same subsidy. Perhaps the greatest good which would come from it would be that it would distribute the cost of government more evenly and it would place publicly owned utilities on a basis of fair competition with privately owned ones, thus giving the people an opportunity of judging which type of operation is really the better by a comparison of results arrived at under comparable conditions.

Insanity—or Just Foolishness?

WHEN the "movie" director wishes to signify by means of action that the mind of one of his characters has failed, there is one little stunt which never fails to register. The victim of delusion is set to perform the following little trick, seriousness written on every feature.

With the thumb and forefinger of the left hand the demented one is seen to make a circle through which, from below, he pokes the thumb of his right hand. Then with a stealthy, quick movement he tries to grab that protruding thumb with the hand of which the thumb is a part. The effect is ludicrous; one knows at once that the poor soul is hopelessly befogged, for no one in his right mind would grab at a thumb that he knew couldn't be there if it was on the hand with which the grabbing was to be done.

There is a parallel to this idiotic movement, in the method by which some well-meaning contractors approach an electrical installation. A consulting electrical engineer recently made the public statement that on a hotel job which his firm had laid out a contractor figured that the client could leave

out 1,350 outlets, and he sold his services on the saving that such a step theoretically would effect.

"If that is support from the contractor, when we are laying out jobs which will boost his game, at the same time giving the customer a high class job, I'll eat it," said this engineer. "Why, that fellow changed a hotel into an ordinary lodging house."

There is always the temptation to sell a cheaper job than the customer actually may want, on the theory that it is doing him a favor. Yet it hardly can be considered a favor to a customer to deprive him of a potentially high-class installation when he is willing to pay for it, and in fact may be anxious to have the very best. One first-class salesman at a luncheon of electrical men made this very point in the art of merchandising. He declared that a customer likes to be flattered by the thought that the one trying to sell him goods considers him as worthy of the very best, of appreciating quality, and of not being thought cheap.

The contractor who offers to cut out electrical convenience from any new job, in hopes of landing the job on price, is making just as ridiculous a spectacle of himself as the man who tries to grab the thumb that isn't there. And since, in the long run, it reflects in a serious manner upon his pocket-book, it is not only foolish, it is pathetic.

Don't Overlook

the Washing Machine

IN all of the special sales effort now being made by the central stations for the promotion of the greater application of electricity in the home, what has become of the washing machine? It is granted beforehand that the ideal is the 100 per cent electrical home, and that the major theme in promoting this idea is the elimination of household drudgery. Advertising copy using the contrast appeal is especially effective, depicting the "Then and Now" idea; the spectacle of the housewife bending over a scrubbing board as opposed to the electrical servant typified by a modern electric washer strikes a responsive chord in the hearts of the majority of people.

True enough, the washing machine is not a great load-builder. About \$2 per year is about the average revenue to the central station, and perhaps a little more when the electric iron is taken into consideration. But is this the only item for consideration? There is also the value of the washing machine as a builder of good will for the electrical idea in the home. Taken in the order of their relative importance as lighteners of domestic burdens, there are (1) the electric iron, (2) the electric vacuum cleaner, and (3) the washing machine. The fact that the washing machine is so inexpensive to operate is a point in its favor rather than a detriment.

Why should not the central-station salesmen in their house-to-house canvassing put in a friendly word for the washing machine? The trade in the vicinity could take care of the interest thus produced and effect the actual sales if the salesmen's time had to be concentrated on ranges, water and air heaters. It is said that where washing is done at home those who are more affluent than the aver-

age have real difficulty in obtaining domestic help for washing where there is no electric washing machine. This being the case, what more could be done to create good will for the electrical idea in domestic applications than to promote the washing machine actively?

A National Engineering

Museum for the United States

THE recent visit to the Pacific Coast of Dr. Oskar von Miller, founder of the remarkable German National Museum at Munich and noted German engineer, has brought the subject of a National Engineering and Industrial Museum for the United States to the attention of many Western engineers for the first time. The movement for the establishment of such an institution for the preservation of historical and research material in technical fields is not new in this country—in fact there are incipient campaigns for two such organizations already under way, one contemplating the establishment of a museum in Washington, one in New York. This is an embarrassment of riches. There can be no objections to any number of technical museums established in different sections of the country for local use, but inasmuch as both these institutions now contemplated purport to be of national scope and look to national support for their establishment, there is little likelihood of either coming to realization while the other is in the field. The West, which has made history in many fields of engineering, will have much to offer such a museum when it is established and has a vital interest in where and how it is to be conducted. Western engineers should acquaint themselves with the situation and should aid in clearing the way so that the best of these projects actually may be put into effect in the near future.

Replace Obsolete Lighting

Fixtures in Wired Homes

KITCHEN-LIGHTING campaigns have done more for the industry than add load to the lines of the power companies and result in business for the manufacturer, jobber and contractor-dealer. They have brought home the fact that the housewife is interested vitally in better home-lighting, and they have shown that many of the homes are equipped with obsolete lighting fixtures, not only in the kitchen but in practically every room in the house. As a result of recent studies it is estimated now that one-third of all ceiling lighting fixtures in the wired homes of the country are inefficient and out of date.

It would seem that here is an opportunity for every branch of the industry interested in better lighting. Particularly should the lighting fixture manufacturers and contractor-dealers give thought to the situation. With the interest created by the Home Lighting Contest still fresh in the minds of the public, the time seems ripe for a national "re-fixturing" campaign. At least the idea is worthy of consideration.

Indeed there is being talked in the East just such a follow-up next year, after the Industrial Lighting Activity has reached its full impetus and can go on of its own momentum. Such a plan should be a worthy successor to the Home Lighting contest of last year.

What's in a Name?

SOME communities grow in spite of the kind of newspapers they have; others because of them. In the latter category will be found the city of Los Angeles, not the least of whose attributes of greatness is the "Los Angeles Times," a real newspaper, that has courage, character, and the will to do things for the community it serves.

No better proof of courage could be offered than the line on its mast-head preceding the editorials. It reads "LOS ANGELES (Loce-Ahng-hayl-ais)". To brave the sharpened pencils of the "colymnist", the paragrapher and the vaudevillian by thus flying in the face of the proletarian version of these two beautiful Spanish words, and to attempt to change the "Los Ann-jull-luss" of the man on the street into the liquid lisp of old Castile is a contract indeed.

What is the matter with the "San Francisco Chronicle"? Where is its vaunted enterprise, that it lets its contemporary on the south get away with this culture "complex"? What boots it if the Times has beaten the San Francisco daily to it? Let us have "SAN FRANCISCO (Thahn Frahn-thee-thko)", and then pass the idea along to the minority of the San Francisco Board of Supervisors and get them to offer a resolution or two about it. Adding the Castilian lisp "s" is a great idea, an evidence of a cultural "kink" that would make the "Loce Ahng-hayl-ay-noes" turn positively green with envy. Then, after this job is done, let us get to work on San Jose, Milpitas, Pajaro, Hueneme, San Joaquin and all the others. Californians, Inc., should look into this.

The Importance of Bookkeeping in Municipal Operation of Utilities

AT a recent municipal election in San Francisco a minority group of city fathers was returned triumphantly to office on the strength of a campaign for economy in city administration. The city tax rate was under fire, and so effective was the clamor that the "Economists" won out, the voters apparently failing to analyze the various items that went to make up the tax budget, most of it being obligatory due to action of the voters in authorizing bond issues for various purposes. Items contributing to the advance in the tax rate were increases in pay granted to the police, firemen and school teachers, all ordinarily having definite political value as popular moves.

Now come the platform men of the municipal street car lines demanding an increase in pay amounting to \$1 per day per man. Thus the "Economists," pledged to lower the tax rate, find themselves in an interesting predicament. One supervisor advocated granting the increase and providing

for future extensions of the lines by bond issues rather than from the somewhat nebulous earnings of the car lines. There was much fiery debate, the "buck," in the parlance of the street, being passed back and forth by opposing groups within the board.

Then came a real idea. It finally was suggested that action on the question be postponed until the "bookkeeping" system could be changed so that increases in pay could be granted from earnings. The depreciation item is to be subject to a capital operation, by which a reduction in the rate of depreciation will produce a corresponding increase in the "net" earnings, and thus provide additional profits from which the wage increase can be met.

Profitable municipal operation of utilities is really quite simple. It is merely a matter of bookkeeping.

DISCUSSION

Engineer Supplies Additional Data on Vaca-Dixon Substation

To the Editor:

Sir:—I note a short article on page 351 of the Nov. 1, 1925, issue of the Journal of Electricity describing the 40,000-kva. synchronous condenser recently installed in Vaca-Dixon substation. Permit me to correct the statements in the last paragraph.

The 1,810-hp. motor is not primarily a starting motor although it may be used for that purpose. Normal operation of the 40,000-kva. condenser is exactly the same in all respects as the two original 20,000-kva. condensers; that is, it is started from the 3,300-volt starting bus and comes up to speed in about thirty seconds, after which it is transferred to the 11,000-volt running bus. Approximately 16,000 kva. is required for starting under the above conditions.

The driving motor is used solely for line-testing purposes. With something over 600,000 kva. available at Vaca-Dixon substation under short-circuit conditions, the testing of the 110-kv. or 220-kv. lines after they have been relayed out imposes a severe duty on the oil circuit breakers. The 1,810-hp. motor is a variable speed motor which permits building up the voltage at reduced frequency and affords a flexible and convenient instrument for line-testing purposes. The motor will deliver an external load of 750 kw. for this purpose and requires approximately five minutes to bring the condenser from rest to a maximum of 700 r.p.m.

Your attention is also called to the fact that the condenser cooling air is conditioned by passing through an air washer furnished by the Carrier Air Conditioning Company of America.

E. A. CRELLIN,
Assistant Engineer, Division of Hydroelectric
and Transmission Engineering.



SAN FRANCISCO City Hall. The fan effect shown in this picture was produced by lights on another building and is not a part of the permanent installation. The radio panchromatic fountains to the extreme left and right are permanent, though separate from the flood-lighting. The volume of water is controlled by radio in synchronism with the music that is being received.

Details of Several New Floodlighted Buildings in San Francisco

By Roy N. Phe'an

Associate Editor, Journal of Electricity

FLOODLIGHTING has a great many applications, and this newly developed field of lighting is coming into use more and more. It has come into its own in several installations which are now in operation in San Francisco. Most important among these are the City Hall, the Pacific Telephone and Telegraph Company Building, and the Pacific Gas and Electric Company Building.

The City Hall installation was completed in time for the state's Diamond Jubilee celebration. The installation, however, is a permanent one of which San Francisco may well be proud. One of the features of the installation is the fact that all floodlighting units are installed on the building itself, making it unnecessary to depend upon other structures for light sources.

This is a highly desirable condition. However, in a great many cases this is impossible when it is desired to floodlight the entire building, because of the difficulty in obtaining suitable locations for the projectors.

Three revolving beacons are installed in the lantern at the top of the dome. These beacons are General Electric type CR-1 form A-6 revolving projectors with 1,500-watt lamps in each. Each one is revolved by an individual 1/16-hp. motor. A necklace of lights around the dome a short distance below the lantern consists of sixteen 100-watt clear lamps installed in weatherproof sockets.

A 100-watt lamp in a steel Ivanhoe angle reflector placed behind each window in the dome emphasizes these windows and produces a very pleasing result. A beautiful color effect is produced behind each urn at the base of the upper dome by the installation of a 200-watt lamp in an Ivanhoe reflector with a red glass cover. Similar colored lights also are installed in the wells at the base of the dome; a 100-watt lamp is placed in an enclosing globe 16-in. by 8-in. There are two of these units in each of the sixteen wells around the dome. The relative position of the various units may be seen in Fig. 1.

The dome proper is lighted with 113 General

SEVERAL striking floodlighting installations which have caused considerable comment have been made in San Francisco. The three particular installations treated here are on buildings of distinct types, all of which are good subjects for floodlighting. These installations have many novel features which are particularly interesting to the electrical engineer and the contractor. Many of these are applicable to other installations in the Western states. This article describes them in detail.

Electric L-9 projectors with 500-watt lamps in each. The octagon deck or base of the dome is lighted by 30 General Electric L-15 projectors with 1,000-watt lamps each. These are located in four banks installed at the four corners of the roof and four banks on the pediment roof. The four major banks in the corners of the roof consist of 26 L-9 projectors with 500-watt lamps and 6 L-15 projectors with 1,000-watt lamps. In back of these there are two 18-in. hand-control incandescent searchlights of the H.C.M. type with 1,500-watt lamps in each. The

typical banks in the four corners of the pediment roof have two L-15 and two L-9 projectors. At the present time, however, the complete equipment is installed in but two of these corners; one has one L-15 and three L-9 projectors, and one has two L-9 and one L-15 projectors. In the near future all will have the typical grouping (see Fig. 2-B).

The searchlights are focused on the lantern and the spiral; the L-9 projectors are focused on the upper dome, and the L-15 projectors on the octagon deck or base of the dome.

An artistic color effect is produced on the colonnade facing Polk Street by the use of 42 L-9 projectors with 500-watt lamps in each. Two of these are installed in each bay.

The following is a summary of the equipment used in lighting the upper portion of the building:

113 L-9 projectors with 500-watt lamps.....	56,500 watts
30 L-15 projectors with 1,000-watt lamps.....	30,000 "
8 18-in. searchlights 1,500-watt lamps.....	12,000 "
3 24-in. beacons 1,500-watt lamps.....	4,500 "
16 reflectors (back of urns) 200-watt lamps.....	3,200 "
32 reflectors (wells) 100-watt lamps.....	3,200 "
16 lamps (necklace) 100-watt lamps.....	1,600 "

In lighting the colonnade:

42 L-9 projectors with 500-watt lamps.....	21,000 "
Total.....	132,000 "
Total floodlighting load.....	132 kw.

Floodlighting is one of the most effective, yet inexpensive forms of advertising. All costs used in this report are based on an average cost of \$0.02 a kw-hr. for current and on a \$2,500 a year lamp contract, which is an outside figure of the amount that would be paid for each of these items in any

building of the size described and does not take into account the cost paid by these particular firms. The installed capacity of the particular building would tend to reduce this figure in a large job.

132. kw. installed @ \$.02 av. rate = \$2.64 per hr. for current.

Lamp Costs		
48	100-watt lamps @ \$.50	= \$ 24.00
16	200-watt lamps @ .80	= 12.80
155	500-watt lamps @ 2.00	= 310.00
30	1,000-watt lamps @ 3.75	= 112.50
11	1,500-watt lamps @ 9.00	= 99.00
		\$558.30
		.71 (discount 29% on a \$2,500 a year contract).
		\$396.39 Net cost of lamp renewals.
		\$.396 per hr., cost of lamp renewals on a basis of 1,000 burning hours as the life of a lamp.

\$2.64 per hr. power cost.
.40 per hr. lamp renewal cost.

\$3.04 per hr. operating cost.

The floodlighting was laid out by H. E. Mahan under the direction of D'Arcy Ryan of the General Electric Company. The electrical installation was made by the Butte Electric & Manufacturing Company.

The Pacific Telephone and Telegraph Company Building

The 26-story building of the Pacific Telephone and Telegraph Company is distinctive, incapable of classification as typical of any style or school of architecture. It is an imposing structure that is an ideal subject for floodlighting. All floodlighting units are installed on the building itself and are concealed entirely from view from the street. Western Electric Davis projectors are used exclusively. There are 139 No. 1-W Western Electric Davis reflectors with 1,000-watt lamps, 33 PS-5 projectors with 500-watt lamps and 111 PS-2 reflectors with 200-watt lamps used in floodlighting the building, totaling 177.7 kw.

The first break in the contour of the building occurs at the nineteenth floor level and consists of a 20 x 20 ft. indentation at the southeast, northeast and northwest corners. In each of these are fourteen 1,000-watt units and five 200-watt projectors.

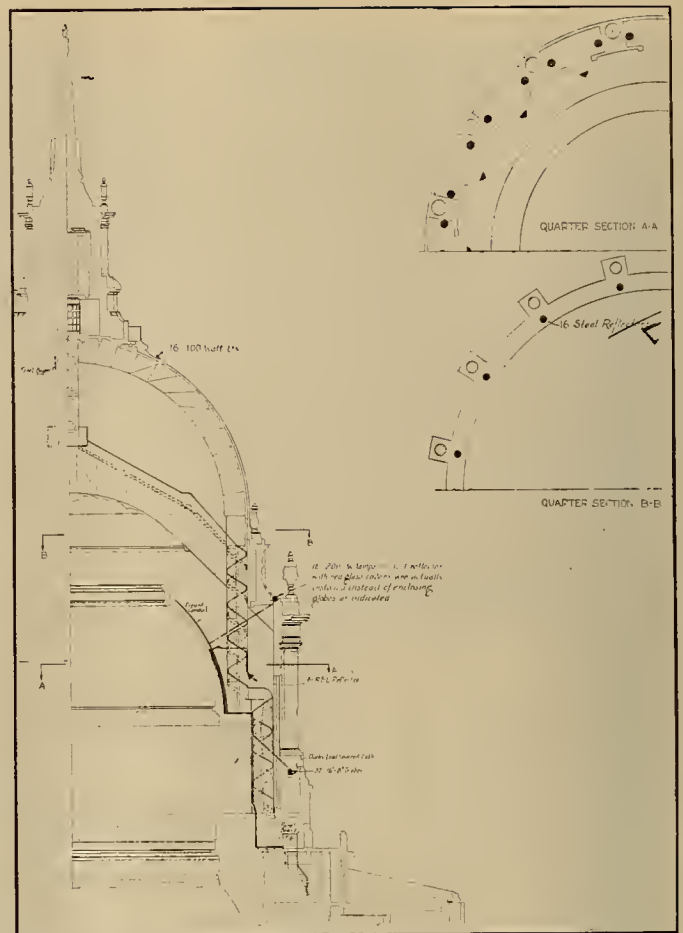


Fig. 1—Half elevation and two quarter sections showing arrangement of lights on City Hall dome.

These units light the two faces of the building in each of these corners from the nineteenth floor level up. The effect produced is decidedly pleasing, and from a distance it is hard to understand what produces the floodlighting with its straight lines of light at the corners without any light on other parts of the building at this level. This effect

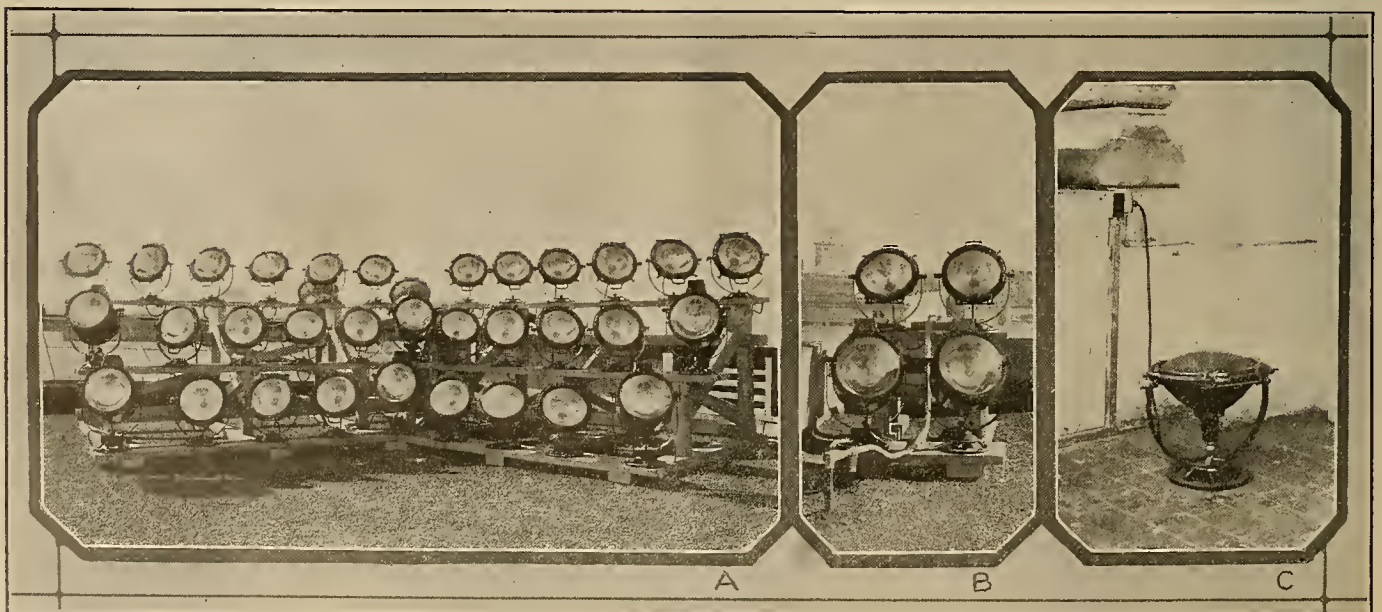


Fig. 2—Projectors on the City Hall. A. One of the four main banks which light the dome. B. One of the banks on the pediment roof. C. Two projectors like this in each bay light the colonnade.



Fig. 3—The Telephone Building during the day.



Fig. 4—The Telephone Building at night.

may be seen in Fig. 4; Fig. 5-A shows a group of these units.

The east face from the twenty-third floor level up is illuminated from a bank made up of twenty-three 1,000-watt units and thirty-four 200-watt units ex-

tending over a length of 117 ft. The south face has nine 1,000-watt units and ten 200-watt units distributed over a distance of 38 ft. The north face has nineteen 1,000-watt and twenty-six 200-watt units over 104 ft. The west face seven 1,000-watt

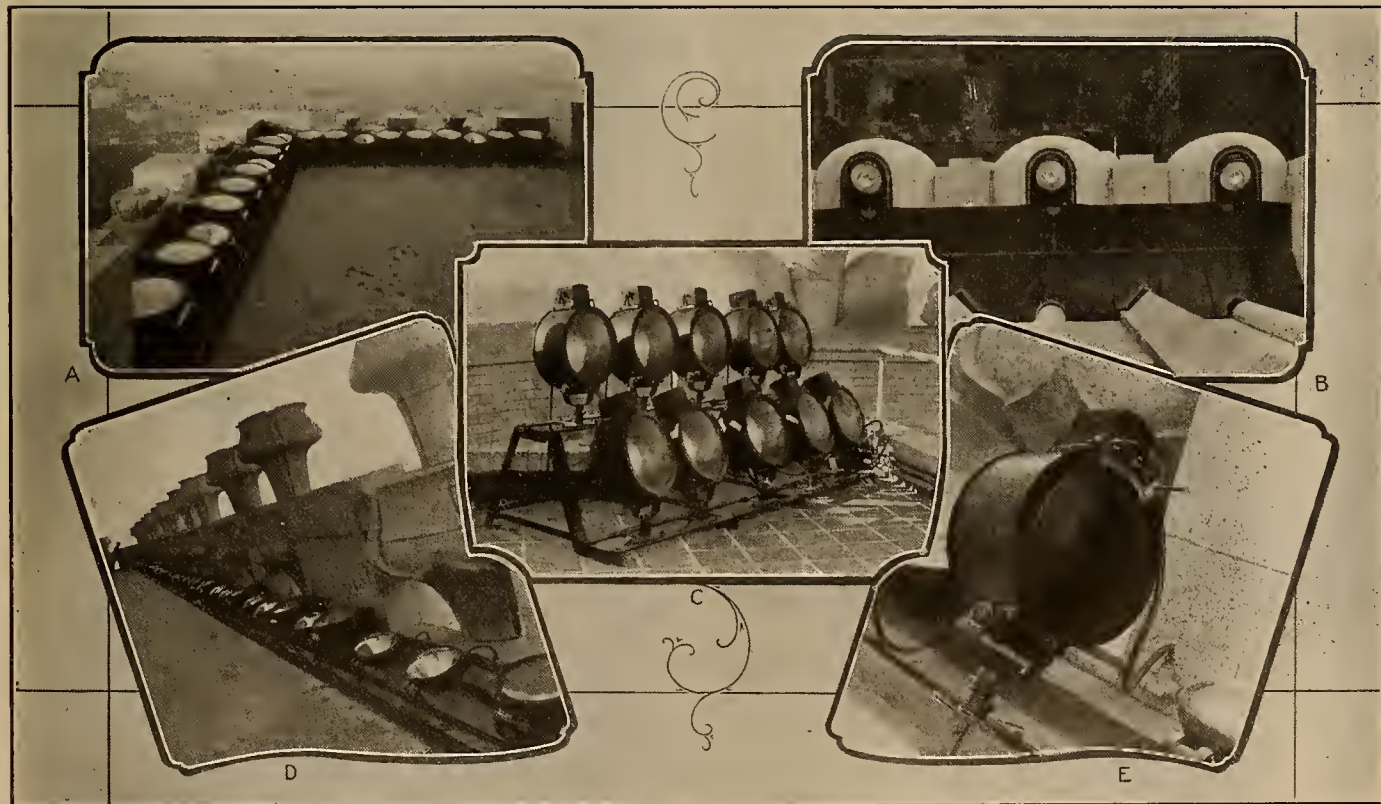


Fig. 5—Some of the projectors on the Pacific Telephone and Telegraph Company Building. A. One of the three banks at the nineteenth floor level which light the corners. B. Three of the thirty-three 500-watt units installed in the top of the urns at the roof-floor level. C. A bank of ten 1,000-watt projectors on the roof; these light part of the tower. D. This group of units lights the east face of the building from the twenty-third floor level up. E. A close-up view of one of the 1,000-watt units shown in D. Note the yoke with the adjustable legs which has replaced the handle, and the water-tight connection from the floodlight to the conduit.

and eight 200-watt units over 29 ft. Fig. 5-D shows the bank on the east face.

The 1,000-watt units in the flat banks have had the handles removed. Each handle is replaced by a cold rolled steel yoke with two adjustable legs. After being raised and returned to the original position, the projectors are not thrown out of focus; the friction clamp ordinarily used tends to loosen and each time it is moved the projector must be readjusted. This idea was developed by C. Felix Butte. This yoke may be seen in Fig. 5-E. A water-tight connection from the floodlights to the conduit is made by the use of Tirex cord and rubber packing gland, held in a conduit nipple with a conduit bushing. The units are held in their horizontal position on the rack by friction, being clamped to the framework with bolts. This permits them to be moved one way or the other in making adjustments.

The parapet extending around the faces of the building at the roof floor level has thirty-three 500-watt units recessed in copper cups in the top of the urns. These are distributed as follows: east face, 14; south face, 4; north face, 12; and west face, 3. Three of these are shown in Fig. 5-B.

The tower is lighted by groups of 1,000-watt and 200-watt units distributed as follows: south side, six 1,000-watt and four 200-watt units; east face, nine 1,000-watt and four 200-watt units; north face, six 1,000-watt units and five 200-watt units; west face, ten 1,000-watt units.

Fig. 5-C shows a bank of ten 1,000-watt units on the roof that light part of the tower. Two of the banks are double-decked like this one, and two are single-deck banks. The tower floodlights are located

Table 1. Pacific Telephone and Telegraph Building Floodlighting.			
Corners: Nineteenth floor to roof level throws.			
Total lamps installed in the 3 corners	15	200-watts	
	42	1,000-watts	=45,000 watts
			10,338 sq. ft.
Twenty-third floor ledges	78	200-watts	4,352 watts per sq. ft.
	58	1,000-watts	=73,600 watts
			18,820 sq. ft.
			3,910 watts per sq. ft.
Roof level, four sides of tower and urns	14	200-watts	
	33	500-watts on urns	
	39	1,000-watts	=58,300 watts
			9,960 sq. ft.
			5,853 watts per sq. ft.
Flag, 4 1,000-watts			
Average watts per sq. ft. = $176,900 \div 39,118 = 4,522$ watts.			

on the stairway roofs and the penthouse structure. The flag above the tower is lighted by means of four 1,000-watt units on the roof just below it.

An 800-amp. circuit breaker is installed for controlling all floodlights. This circuit breaker includes sufficient capacity for lights for the south wing of the structure that will not be built until some future date. There are two floodlighting panels located on the nineteenth floor. These are supplied by two feeders, each separately controlled. Two feeders also are run to the twenty-third floor panels. One panel is located also on the twenty-seventh floor and one on the twenty-eighth floor; each of these has a separate feeder. Every 1,000-watt unit is on a circuit by itself, and the smaller units are grouped into circuits of 1,000 watts each.

J. R. Miller and T. L. Pflueger, and A. A. Cantin were the associated architects. Simonson and St.

John, San Francisco, were the consulting electrical engineers for the building. Arthur Fryklund, lighting specialist of the Western Electric Company, San Francisco, assisted the engineers in the floodlighting work. The electrical installation was made by the Butte Electrical Equipment Company, San Francisco.

Following the same method of calculating the operating cost, as previously shown, its inexpensiveness readily is seen:

177.7 kw. installed @ \$.02 av. rate = \$3.554 per hr. cost of current.	
Lamp Costs	
139 1,000-watt lamps @ \$3.75	= \$521.25
111 200-watt lamps @ .80	= 88.80
33 500-watt lamps @ 2.00	= 66.00
	\$676.05
	.71 (discount 29% on a \$2,500 a year contract).
	479.995 net cost of lamp renewals.
	.48 per hr. per lamp renewal cost on a basis of 1,000 burning hours as the life of a lamp.

\$3.554 per hr. power cost.
.48 per hr. lamp renewal cost.

\$4.034 per hr. operating cost.

Pacific Gas and Electric Company Building

The Pacific Gas and Electric Company Building is floodlighted by using a combination of units installed on the building proper and on the roofs of buildings across Market Street and Beale Street.

There are sixty-three mogul No. 91-E X-Ray 1,000-watt wide-angle projectors used on the building, 27 units being on the fourteenth floor level and thirty-six on the sixteenth floor. On the fourteenth floor the units are installed on each side of the columns at their base. Those on the sixteenth



Fig. 6.—The Pacific Gas and Electric Company Building. The floodlighted tower to the left is part of the Matson Building.

floor are located on a balustrade which extends around the building; they are placed on approximately 7.5-ft. centers. An economic mounting was designed by C. Felix Butte who installed the electrical work. As seen in Fig. 7, it is made of sheet metal and holds the units in a vertical position.

There are sixty-two L-15 General Electric projectors installed on the roofs of buildings across the street. The Market Street bank is made up of



Fig. 7—Projectors installed on the balustrade extending around the Pacific Gas and Electric Company Building at the sixteenth floor level.

36 projectors while the bank on Beale Street contains 26. The bank on Market Street is divided into three groups of 12 projectors each, and each group is controlled separately for convenience; any or all three of the groups may be lighted at any one time. On the Beale Street side a similar arrangement is made using 10, 8 and 8 projectors. Remote-control switches are installed at each bank and also in the building so that they may be controlled from either place. Attachments have been made so that color screens may be used for special occasions.

The roof structures are particularly noteworthy in that they do not add any additional weight to

Table II. Pacific Gas and Electric Company Floodlighting.			
Fourteenth floor.....	26	1,000-watts=	26,000 watts
			8,512 sq. ft.
			3.05 watts per sq. ft.
Sixteenth floor.....	37	1,000-watts=	37,000 watts
			7,400 sq. ft.
			4.9 watts per sq. ft.
Market Street side on roof			
opposite building.....	36	1,000-watts=	36,000 watts
			18,225 sq. ft.
			1.97 watts per sq. ft.
Beale Street side on roof			
opposite building.....	26	1,000-watts=	26,000 watts
			12,060 sq. ft.
			2.15 watts per sq. ft.
Average wattage total.....			125,000 watts
			60,137 sq. ft.
			2.07 watts per sq. ft.

the roof of the building. The bolted frames of these structures tie in to the steel frames of the columns of the existing building and the firewalls. All are bolted instead of being riveted because of the indefinite length of time that they may be allowed on any building. By being bolted, they can be dismantled and moved to another position; these frames are very rigid.

The units across the street never are pointed lower than the fourth floor because of passersby seeing them, which would tend to kill the desired effect. In this particular installation about 10 foot-candles of illumination are projected on the face of the building.

Following the same method of calculating the operating cost, it may be seen what inexpensive advertising is secured by floodlighting.

125.0 kw. installed @ \$.02 av. rate = \$2.50 per hr. for current.
 125 1,000-watt lamps @ \$3.75 = \$468.75
 .71 (discount 29% on a \$2,500 a year contract).
 \$332.81 net cost of lamp renewals.
 .33 per hr. lamp renewal cost on a basis of 1,000 burning hours as the life of a lamp.

\$2.50 per hr. power cost.
 .33 per hr. lamp renewal cost.

\$2.83 per hr. operating cost.

Bakewell and Brown, San Francisco, were the architects and Hunter and Hudson were the consulting electrical engineers on the building. The electrical installation was made by the Butte Electrical Equipment Company.

General

Discussion of these jobs brings out several general conditions which are applicable to most floodlighting jobs. Every precaution should be taken to prevent moisture from penetrating the projectors. When it is necessary to place projectors on the roofs of other buildings, the subject of roof structures and their rentals must be considered. It is most important to have roof structures so located that it is impossible to see the projectors on them from the street.

The intensity to which the area should be illuminated depends almost entirely on two things: the color of the floodlighted area or object and the brightness of the surroundings. The con-

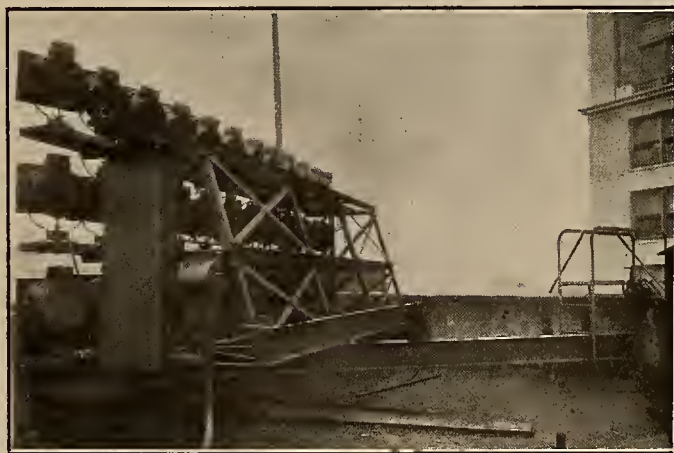


Fig. 8—There are thirty-six 1,000-watt projectors installed in this bank across Market Street from the Pacific Gas and Electric Company Building. Note the ruggedness of the roof structure which does not add any additional weight to the existing roof.

dition to be sought in floodlighting is to have the floodlighted object or area bright enough to stand out in relief against the surroundings.

Floodlighting is good business for the entire industry aside from the benefits derived by the community in an improved appearance of its buildings.

Electricity Driving Longest Railroad Tunnel in United States

By C. H. Vivian

Boulder, Colo.

ELECTRICITY is furnishing the power to drive the longest railroad tunnel in the United States through the Continental Divide in Colorado, forty miles northwest of Denver. The bore, known as the Moffat Tunnel, will traverse six miles of granite and allied igneous rocks at an altitude slightly above 9,000 ft. It will be used primarily for rail facilities, though provisions are being made for the transportation of automobiles through it.

An auxiliary tunnel which is being used as an aid to construction will be utilized to carry irrigation waters from the western slope to the eastern slope of the range. The supply eventually will contribute to the domestic distribution system of the city of Denver.

It is a singular fact that the same mountains that are being tunneled are furnishing the energy that is driving the drills. Waters from the melting snows in close proximity to the east portal of the bore are harnessed at the Boulder Canyon plant of the Public Service Company of Colorado to create the power which is transmitted back up and across the hills to motivate the machinery that is gouging a shaft of daylight through the rocky barrier.

Work on the project was started in September, 1923, under a contract calling for completion in forty-six months. With less than half of this period elapsed, however, progress has been made which indicates that the workmen will "hole through" during the summer of 1926 and will put the finishing touches on their task several months in advance of the time set.

The operation is essentially one of hard-rock mining. The principal features are drilling, blasting, removal of the excavated material and timbering.

Electric power is used exclusively and has been one of the leading factors in enabling the working crews to shatter repeatedly world's records for progress and economy. Unless something unforeseen occurs, it is certain that the total elapsed construction time will be not more than forty months. Comparison of this period with the time required for completion of similar projects over the world serves

THE Moffat Tunnel through the Continental Divide near Denver is being driven by electricity in record time. Through the use of synchronous motors a load factor of 95 per cent is maintained with a monthly consumption in excess of 500,000 kw-hr. One of the features of the job is the use of electric mucking machines to remove muck from the tunnel.

to emphasize the speed of the present operation.

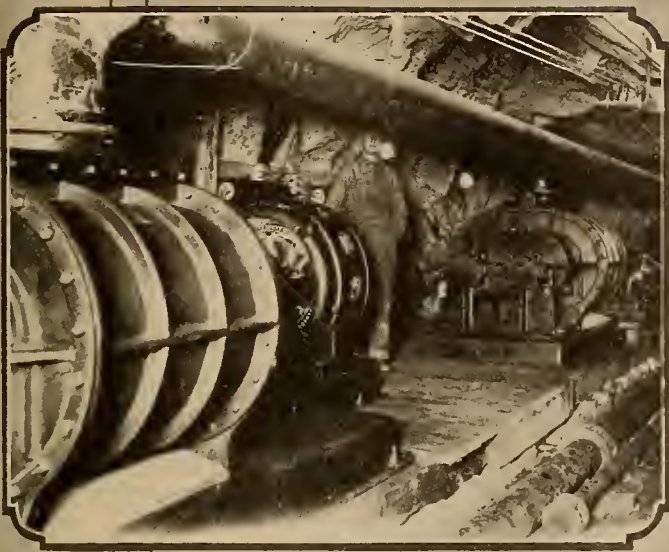
The Mont Cenis Tunnel between France and Italy, 7.6 miles long, required thirteen and one-half years to build. The Hoosac, between Troy, N. Y., and Greenfield, Mass., $4\frac{3}{4}$ miles long, was started in 1855 and opened in 1876. The St. Gotthard, in Switzerland, 9.3 miles long, required nine years to complete. The Simplon, between Switzerland and Italy, 12.3 miles long, was constructed in

seven years. The Rogers Pass Tunnel on the Canadian Pacific line established a world's record for advance. However, average monthly figures made there are being eclipsed in the Moffat Tunnel despite the fact that the greater size of the Rogers Pass project permitted speedier handling of the rock.

The Moffat Tunnel will enter the Continental Divide on the east flank of the range at an elevation of 9,187 ft. above sea level. From that point it will rise on a gradient of three-tenths of one per cent to the center, which will have an elevation of 9,241 ft. Then it will drop on a gradient of nine-tenths of one per cent, emerging on the west side at an altitude of 9,085 ft.

Construction is being carried on simultaneously from both sides of the range where towns known as East Portal and West Portal have been established. The pilot bore, commonly known as the water tunnel, parallels the main tunnel at a distance of 75 ft. to the south. By cross-cutting from this to the main line at intervals of approximately 1,500 ft. the actual problems of construction are simplified greatly.

The pilot bore is theoretically 8 ft. by 8 ft., although for facility of construction it is being made approximately 9 ft. by 9 ft. On the same level with this water tunnel an advance heading of similar size is being driven in the center of the main bore. From this central opening excavation to full size, 16 ft. wide by 24 ft. high, subsequently is effected. At the west end, because of the soft and broken character of the rock for the first 7,000 ft., this plan of operation had to be varied somewhat.



1



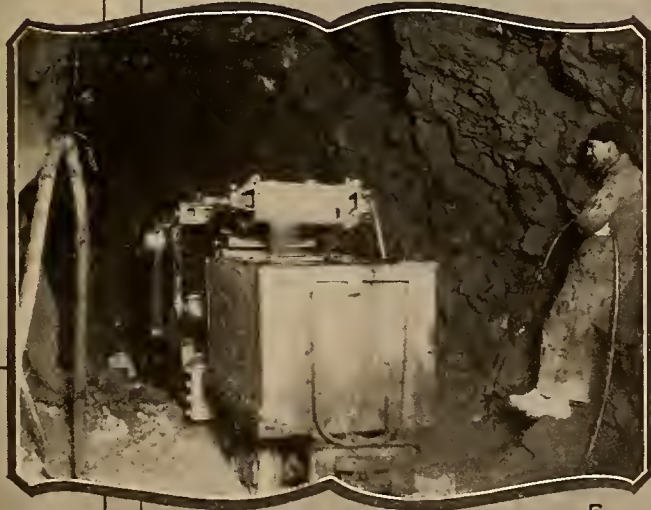
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5

IN driving the Moffat Tunnel under the Continental Divide west of Denver electricity plays an important part. Ventilation is one of the major problems. No. 1 shows two motor-driven Roots blowers inside the tunnel. No. 2 pictures the electric locomotive David H. Moffat, named in honor of the projector of the tunnel. Storage battery and trolley locomotives are used for hauling muck from the tunnel. No. 3 shows one of the many motor-generator sets in use. No. 4 is a view of the outdoor substation at the West Portal. The line which brings energy to the tunnel crosses the Rockies at an elevation in excess of 12,000 ft. No. 5 shows one of the electric mucking machines which have aided workers in making many records.

The general plan there was to drive the advance heading at the top of the center line of the completed bore. It then was excavated to full width, and after that the bench of 16 ft. was removed. With both headings now in solid rock, however, the original plan is being followed closely.

All labor crews and material for advance heading work in both tunnels go in through the auxiliary bore, and all muck is removed by the same route. All air and water lines also are carried in the smaller tunnel.

The power is delivered by transmission line to outdoor transformer stations at each base of operation in the form of 3-phase alternating current at 44,000 volts and 63 cycles. This is reduced to 2,300 volts and subsequently rectified by underground synchronous motor-generator sets to provide 250-volt direct current for operating electric locomotives, air blowers, fans, mucking machines, and so on. The synchronous motors are excited so as to keep the load power factor at about 95 per cent. For the lighting circuits of the tunnels and camps the voltage is cut down to 110 volts by suitable transformers.

The total power used amounts to between 500,000 and 600,000 kw-hr. monthly. The contract with the Public Service Company of Colorado was drawn on a basis of 1,000 hp. demand. The schedule of rates, providing for charges upon the total requirements and average use during a month of 730 hours, is as follows:

Demand	Average Use During Month	Total Bill per Month	Per hp. of Demand per Mo.
1,000 hp.	500 hp.	\$3,665	\$3.665
1,000 hp.	625 hp.	4,055	4.055
1,000 hp.	750 hp.	4,361	4.36

The power generated by two 7,500-kw. impulse-type turbines operating under a 1,870 static head of water which is impounded at Barker reservoir near Nederland and transported 12 miles through a 36-in. pipe line to Kossler Lake at the rim of the canyon above the plant.

The transmission line, carried on wooden poles across 30 miles of rough country to East Portal, was constructed in 120 days. From East Portal to West Portal the line crosses the divide by the shortest possible route. It is nine miles in length and reaches an elevation of approximately 12,050 ft., making it one of the highest lines of 44,000 voltage in the country.

Maintenance of this line in winter calls for resourcefulness and hardihood. Gales of 60 to 90-mile velocity pack the snow into deep drifts, while temperatures of 50 deg. below zero are not uncommon. At certain points on the line drifts reach to the crossarms of the 35-ft. poles. On one occasion an Italian laborer walked into one of the wires and was electrocuted. Wires often are buried in the snow, but because of the dryness of the precipitation there is little trouble from this cause. Patrols are called upon constantly to remove weighty sleet from sagging lines. Despite the apparent obstacles in connection with maintenance, total outages since work started have been less than 20 hours.

Compressed air is the motive force employed in

the actual drilling, in a large part of the excavating and loading, and for ventilation. Naturally great amounts of it are required. At East Portal the compressor plant consists of three large machines and one small one, and at West Portal there are three large units. These deliver a combined supply of approximately 8,000 cu. ft. of air per min. at 100 lb. pressure. The larger units are driven by 200-hp. motors and the smaller machine at East Portal by a 75-hp. motor. All are of the synchronous type.

The high-pressure air is carried underground in an 8-in. main, from which feeder lines run to the various points of use. Drilling at the advance headings is speeded by a specially designed drill carriage which enables four machines to work at the breast at the same time. This is mounted on railway trucks, allowing it to be moved back when blasting is being done. The average time required for drill set-up is 15 min.

Twenty-four holes constitute a round. They have a penetration of 8 ft. In actual practice each round of holes breaks about 28 cu. yd. of rock, using approximately 7 lb. of 60 per cent dynamite to the hole. The resultant progress is about 7½ ft. to the round. Delay primers are used in blasting, a wedge at the center of the drilling breast being broken out first, allowing the remaining holes to break against an open face.

The drilling and mucking crews alternate in the advance headings of the railroad tunnel and the pioneer tunnel. Mucking, or loading, is done mechanically, a Conweigh electric mucking machine being used for this purpose. It is driven by a 50-hp. motor, current for which is obtained by tapping the 250-volt trolley line with a water-proof cable which is laid on the ground up to the point of use. The mucking machine, which consists of a gouging dipper which dumps backward onto a belt conveyor, will fill a 50-cu. ft. car in 90 sec. In actual practice about fourteen cars are loaded to the hour.

Ventilation is provided by electrically operated blowers and fans. These are located just short of the crosscut nearest the advance heading in the pilot tunnel, being moved up after each new crosscut is driven. Duplicate blower plants are provided for auxiliary service. Each of these is driven by a 100-hp. motor and delivers 8,000 cu. ft. of 4-lb. pressure air per min. The fan, driven by a 10-hp. motor, delivers 12,000 cu. ft. of air per min. A line from the blower goes through the crosscut to the advance heading of the railroad tunnel. A bulkhead is erected across the pilot bore just in front of the blowers and fan, and all crosscuts but the most forward one are bulkheaded. These structures circulate the fresh air to the advance headings, and the stale air goes out through the main tunnel line. The ventilation is such that the mucking crews can work comfortably at the tunnel breasts twenty minutes after a round of shots is fired.

For work in the advance headings where trolley cannot be maintained 85-volt storage-battery locomotives are used. These are geared for a maximum speed of 3½ miles an hour, and each is capable of

exerting a drawbar pull of 1,000 lb. The storage batteries are charged at stations adjacent to the compressor plants at each portal, special apparatus being provided for handling them.

These locomotives switch the empty cars to the headings and handle the loaded cars back as far as the trolley. There they are picked up by the 4-ton trolley locomotives and made into 12-car trains for haulage to the portals. Outside they are dumped into larger cars to be taken to the dump. All track in the pilot tunnel and advance heading of the railroad tunnel is 24-in. gage. So well co-ordinated are the various steps in the operation that all rock is on the dump four hours after it is shot down in the advance headings.

Enlargement of the advance heading to the full sized 16 x 24-ft. railroad tunnel is effected by means of radial or "ring" drilling. Each set of holes is spaced 4 ft. apart and drilling is done 200 ft. in advance of the firing. Ordinarily from three to five rings are shot at a time, using delay primers so that each ring breaks against an open face. Approximately three pounds of 60 per cent dynamite are used for each cu. yd. of rock broken.

At East Portal an air shovel operating at 100 lb. is used for loading the broken rock. A similar shovel recently was supplanted at West Portal by a St. Joe electric loader driven by a 100-hp. motor.

An advance of as much as 20 ft. a day is easily possible in the enlargement work at each end. The muck is handled in 4-cu. yd. steel cars. These are hauled to the outside by 8-ton, 250-volt locomotives running on 36-in. gage track. Each locomotive working in the enlarged tunnel is equipped with a reel carrying 500 ft. of power cable, which extends the range of operation beyond the point where trolley can be maintained.

At East Portal there is an outside crushing plant which is treating a portion of the excavated material for ballast use. The electrical equipment there consists of a 50-hp. motor on the crusher and 25-hp. units on the hoist and screening plant.

The tunnel is rich in historical background and represents the fulfillment of a dream by David H. Moffat, mining man and empire-builder of Colorado. Opposed by the large railroad interests, Moffat placed his entire personal fortune into the railroad which now bears his name to provide a short line across the Rockies. Because of expediency at the time he built his line over the divide, though he intended to construct the tunnel later.

Moffat died in 1911 while in New York attempting to finance the further construction of his road. Since his death the line, completed from Denver to Craig, Colo., near the Utah line, has had its stormy days and is now in the hands of a receiver.

In 1922 a special Colorado legislature created the Moffat Tunnel District, consisting of Denver County and other counties traversed by the railroad. Bonds in the sum of \$6,720,000 were authorized to build the tunnel, and after the measure was declared legal by the supreme court work was begun immediately.

The tunnel will eliminate 23 miles of 4 per cent track and 11,000 deg. of curvature. It will reduce

the climb over the divide by 2,406 ft. of elevation. The road at present crosses Rollins Pass at an altitude of 11,660 ft. High winds sweep the snow onto the track there to such depths that for days at a time in winter traffic is often at a standstill. It requires four of the most powerful locomotives known to haul a 22-car freight train over the highest portion of the pass at present. Snow-fighting has been responsible for 41 per cent of the total operating expenditures in the past.

Upon completion of the tunnel and the construction of a 42-mile connecting link between the Moffat road and the Denver & Rio Grande Western system in western Colorado, the running time between Denver and Salt Lake City will be reduced by several hours. The road also will open a vast empire of natural resources in western Colorado, which has been retarded because of inadequate rail facilities.

The tunnel project is being administered for the district by a commission. The contract was let to Hitchcock & Tinkler on a profit-sharing basis, with \$5,250,000 as the basic price. This firm has constructed over fifty tunnels in all parts of the world, including one for the San Joaquin Light & Power Corporation near Fresno, Calif. R. H. Keays, engineer on some of the tunnels for the city of New York, is directly in charge of the work for the commission as chief engineer. C. A. Betts is office engineer at Denver. A resident engineer is maintained at each portal.

The tunnel commission provided all equipment and structures. The camps at the two portals are models of sanitation and convenience. Because of the excellent conditions, a minimum wage of \$4.50 a day, and a bonus system whereby the drilling and mucking crews in the advance headings increase their earnings considerably each month, the labor turnover is very low for a project of this type.

Owing to the difficulties encountered with soft rock at West Portal in the early operations, heavy timbering is required there in the completed section. This will make the project more costly than was estimated. However, all indications are that a new record will be set for expense per foot. The total excavation called for is approximately 600,000 cu. yd.

Operation of trains through the tunnel will be by electricity. In fact, it is possible that adjacent sections of the railway also will be electrified. Several firms have prepared complete data on both plans for submission to the tunnel commission.

Colorado Factions Must Agree Quickly.—Reports from Washington are to the effect that unless those who opposed granting of the Girard license on the Colorado at Diamond Creek can come to an agreement among themselves, the Federal Power Commission will not wait longer to give its decision. It is felt by the commission that if there is any danger to the upper states from development on the Colorado River, it will be due to some big storage project such as that at Boulder, and not to one whose purpose is merely to gain head, such as that of Girard. Applications on the Gila River also are being held up by the delay on the decision.

Some Facts About and Some Thoughts On Electric Water-Heating

By Millard Sebern

Assistant Manager, Washington Electric Supply Company, Spokane

ELECTRIC current first was sold intensively in the home for lighting purposes, primarily because every home uses light. Later a multitude of household uses for electricity was developed, and a great deal of time and energy has been expended in aggressive sales campaigns on washing machines, vacuum cleaners, and other devices; but the electrical industry has given at best only a more or less hit-and-miss thought to water-heating.

The water-heating load taken onto the lines of utility companies thus far has been largely in connection with range load, and has been the outgrowth of a desire on the part of the companies to provide, as an added impetus to range sales, an all-electric kitchen from which all other types of fuel have been removed. Now if it is true that every home uses light, it is likewise true that every home uses hot water, and if hot water service can be supplied at a price that is satisfactory to the service company and to the customer, a large business can be developed—a business profitable in itself, whether a range is used in connection with the water heater or not. It is necessary, however, to consider a few basic facts in connection with determining the kind of a heater to sell and the rate to charge for the service.

The problem of changing kilowatt-hours into hot water is simple in the abstract; but the fact must not be lost sight of that the electric water heater will be required to work more hours per day than any other electric heating element in the home. It is obvious, therefore, that if the electric water heater is to be a long-lived device, giving satisfaction to the customer and a minimum of trouble to the serving company, the heating element must operate at a low temperature, preferably under 400 deg. F., in order that burn-outs may be kept at a minimum.

Types of Heaters and Radiation

Water heaters developed up to the present time may be divided into three types: insert, clamp-on and circulation. The efficiency with which heat is transmitted from heating unit to water in the case of any of these types is of little importance because it is nearly 100 per cent in any case. But the transmission of heat to water is only the first step. The most important consideration is to keep the heat in the water until the customer uses it. The radiation loss from a bare 30-gal. tank at 100 deg. above room temperature for thirty days is, by actual test, 450 kw-hr. Range-boiler covers have been developed that will reduce this loss to 90 kw-hr. The comparison of these two figures makes it plain that, whether a storage or intermittent system is used, if electric water heating is to be a success, range boilers must have the best insulation possible.

Inasmuch as radiation losses are one of the greatest drawbacks to economical water-heating, it is fundamental that these losses must be kept at a minimum. In order to do this the tank must have an efficient covering and the heater must be of such a type as can be installed entirely within the range-boiler cover. This is essential because, if heaters are installed outside the range-boiler cover, additional radiation surface is added, that will, of course, reduce the amount of hot water the customer will receive for the kilowatt hours consumed.

Further, it is desirable that the water-heater be of such type as can be installed at the least expense to the customer for the original installation, and as may be repaired or replaced at the least cost in case of burn-out of the element or of trouble with the plumbing.

In summing up the foregoing these basic facts must be acknowledged: that the element of the water heater must operate at a low temperature to insure long life; that the range boiler and piping must be covered with a highly efficient insulation to reduce radiation losses; that the surface area of radiation must be kept at a minimum, preferably no larger than the range boiler; and that the heater must be easy to install and easily accessible in case repair or replacement is necessary.

Sizes of Heaters and Load Factors

There is a great difference of opinion as to the correct size of water heater that should be used. A recent survey in California shows that of 7,183 heaters used, 4,945, or more than sixty-nine per cent, are either 4-kw. or 5-kw. heaters. The report shows further that where continuous automatic service is supplied an average monthly consumption of 574 kw-hr. is required, while in installations where the water is heated intermittently as needed an average consumption of 210 kw-hr. is used. These figures lead to some interesting deductions as to the load factors of the different kinds of installations. Using the above figures, it is found that where continuous hot water is supplied automatically, a 4-kw. heater has a load factor of twenty per cent, and a 5-kw. heater sixteen per cent. Where the water is heated intermittently with an average monthly consumption of 210 kw-hr. the load factor of a 4-kw. heater is 7.4 per cent, and a 5-kw. heater 5.8 per cent. The question arises, "Are these low load factors desirable from the service company's standpoint?"

A recent investigation in the Northwest shows that of the heaters sold by one power company that supplies low-wattage, continuously operated heaters, ninety per cent were of 750-watt capacity or less. This proves that continuous hot water is

being supplied with low-wattage heaters with a monthly consumption of 540 kw-hr. or less, and this with a load factor of 100 per cent. Taking from the California report the average monthly consumption of 574 kw-hr. where continuous hot water is supplied, it is seen that this service could be provided with an 800-watt heater with a 100 per cent load factor. It should be borne in mind that a low-wattage, continuously operated heater, when selected with reference to the family concerned, means **instantaneous** hot water from storage while the comparatively low temperature at which the heater operates means **long life**.

Relation of Load Factor to Peak

The peak-load problem is always one of the main problems of operating companies. Peak loads in the case of household devices usually are caused by habit or necessity. The highest peak on range load occurs between 4 p.m. and 7 p.m., and is caused by the preparation of the evening meal. It is also true that during the period of preparation of the meal and washing the dishes hot water will be used, and this means a water-heating peak will occur at the same time as the range peak. This water-heating peak will be in direct relation to the size of the heater. This condition is undesirable, of course, and the harmful effect of it can be minimized only by using low-wattage heaters with a high load factor. There are two towns in the Northwest where the water-heater saturation is fifty per cent. The heaters in these towns are all of the low-wattage, continuously operating type. Were they of the high-demand type, to perform the same service the operating company would be compelled to increase materially its distribution system to handle the peaks.

Rates

There is a great difference in water-heating rates in different localities, but one thing is certain, namely, that, if electric water heating is to be a success, the rate must be satisfactory to the customer and the serving company. So-called "flat rates" are really not flat rates, since the wattage of the heater is known and the maximum number of hours of use is known, and with these known quantities it is easy to calculate the rate per kw-hr. In considering a low rate per kw-hr. for water heating, either metered or a so-called "flat rate," is it fair to segregate this from the rates for lighting and cooking? Or should this low rate for water-heating be considered as the lowest rate in the block and the return per kw-hr. be figured accordingly on the entire consumption of the customer?

It is perhaps not necessary to state in conclusion that this is not intended as an exhaustive treatment of the complex subject of electric water-heating. It is an attempt only to set down a few fundamental facts and draw some conclusions therefrom on certain phases of the subject. The writer realizes that there is a wide divergence of opinion as to some of the problems presenting themselves in a study of water-heating, and it is with the thought in mind that often ideas are crystallized and effort concentrated by an exchange of opinion that he presents the foregoing material.

Ag Club Boys See Demonstration of Electrical Phenomena

By Ben D. Moses
University Farm, Davis, Calif.

"WHAT is electricity?" This question was asked of 700 boys in attendance at the annual convention of Agricultural Clubs at the University Farm, Davis, Calif., this fall. None had ever seen electricity, none had heard it, none had tasted it, but many loudly proclaimed that they had felt it. This seemed to be a good time to show the Electrical Brownie, ready to serve them with heat, light and power, and "Johnny Kilowatt," a sprightly elf with a genial smile, was introduced. "He" bore a glowing heating element in "his" right hand, a whirling electric fan in "his" left hand, and wore an incandescent lamp in "his" cap. "Thank you, Johnny, for your visit. I hope you will come in as we need you a little later on," brought a nod and "Johnny" retired.

With this introduction, Professor Fletcher of the Agricultural Engineering Division proceeded to demonstrate that electricity can be recognized, not by its appearance, size, shape or other tangible physical properties, but by the phenomena accompanying its passage through a conductor. That a wire carrying an electric current behaves very much like a magnet was demonstrated by the development of solenoid consisting of a simple helical coil of wire wound about an iron core. Experiments with this miniature electric crane then followed; pliers, screwdrivers, and scraps of iron were picked up, transported and dropped on simply closing the circuit by touching the wires and then opening it by separating them.

A heavy induction coil energized by the current from a 32-volt storage battery then was used to magnetize a boy's knife "right through his hand and it didn't hurt a bit."

One of the smaller boys next was asked to hold two bare copper wires, which he did without any inconvenience to him, but much to his surprise and to the amusement of the rest of the boys, he lighted a lamp by touching the two terminals. This demonstration served to explain that unless the voltage is high enough to overcome the resistance of the body no current will pass and consequently there will be no sensation of shock.

"Johnny likes to run through the wire," the boys were told, "but he has more trouble through small wires than large, and his path must be unbroken. When lots of these little Johnny Kilowatts are forced to pass through a wire that is very small they crowd each other and rub elbows so hard that they heat it up." To illustrate how the size affects the "heating up," a frame containing various sizes of wire was used. These wires all were connected to one side of a 110-volt light circuit, a movable wire connected to the other being used to direct the current through the different wires in succession. The large wire was sufficiently large and "Johnny" had no trouble passing through, but his troubles began as the wires became smaller; the smaller the

wire the more trouble he had and the hotter it became till finally he burned the smallest in two.

A small three-phase induction motor with the upper half of the stator removed and the circuits completed in the lower half made a very nice demonstration of the method of operation of the squirrel-cage type of motor. It was rather surprising to see a motor with the top half cut away actually run, and even when two phases were cut out by opening up one wire the motor still ran as a single-phase type. It was quite easy to demonstrate that, with all three phases in, the motor would run in one direction only, and that by simply interchanging any two wires the direction could be reversed. "Johnny" made quite a bit of noise when the motor ran single phase, due to the transformer action, and his presence was indicated not only by his turning the rotor but by his "growl." Of course when operating as a single-phase motor it ran equally well in either direction, depending upon how it was started. Considerable amusement was caused by starting the motor and running it on one phase, then by throwing in the other two phases hear "Johnny" growl, see the rotor slow down, stop, and then of its own accord run in the opposite direction.

The morning's demonstration was brought to a rather spectacular climax by the frying of a hot cake through a newspaper without burning the paper. It was stated that a newspaper was somewhat more effective than an ordinary piece of paper because of the "hot advertisements." It was stated also that there was nothing mysterious about this paper, that in common with all newspapers there was "nothing in it," but "Johnny" was going to work in the box covered by the paper and would try so hard to get out and raise such a fuss that he actually would heat the frying pan and not damage the paper. The apparatus used in this experiment consisted of a heavy induction coil covered

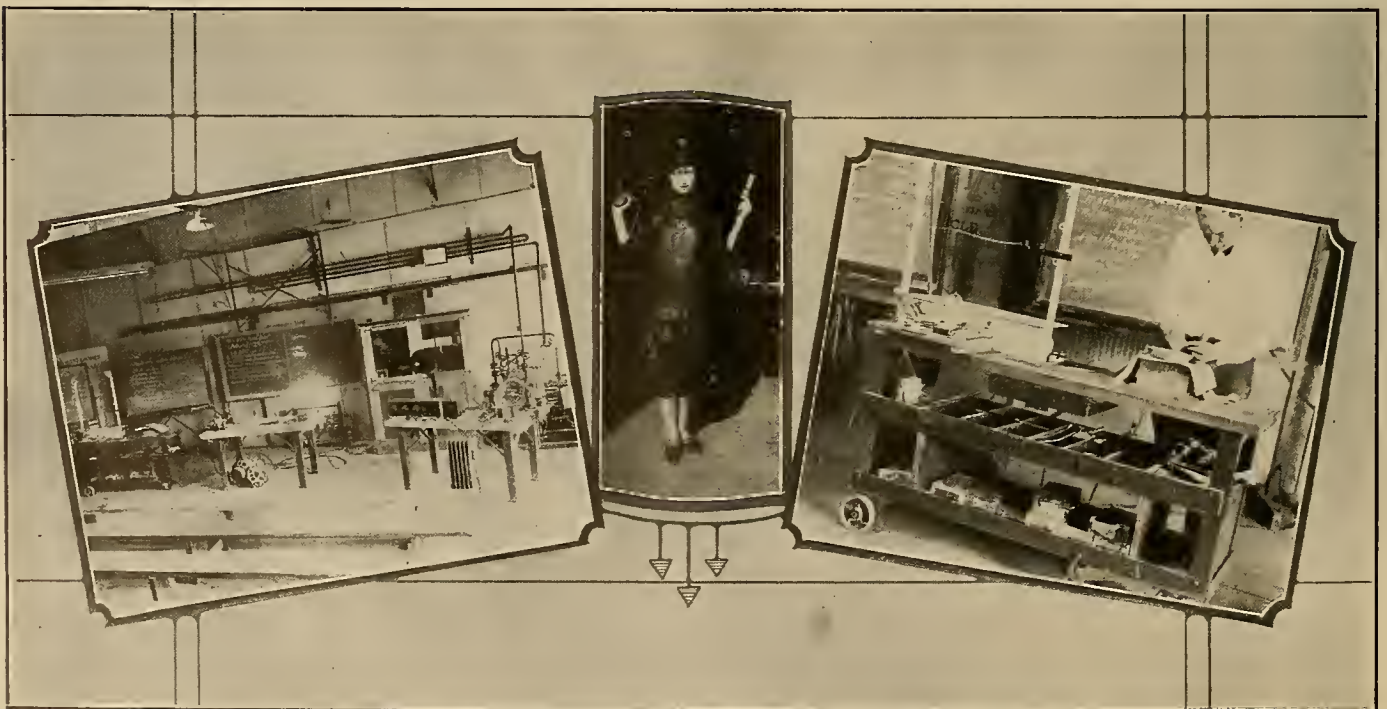
over with a wooden box, a newspaper, an aluminum frying pan and necessarily some cake batter.

When the coil was connected into a 220-volt a.c. circuit the eddy current set up in the flat bottom of the pan caused it to heat up. "Johnny" growled vigorously when the frying pan was put in place and the closer the pan the louder he growled. The metal of the pan being aluminum, there was no magnetic effect and the induced field set up served to repel the pan rather than to attract it. This jumping away of the frying pan caused much amusement among the spectators. A second coil of smaller proportions with a 32-volt lamp connected into the circuit being brought into the field of the other resulted in sufficiently strong transformer action to light the lamp.

"How can you fry a pancake through a newspaper?" and "How can you light a lamp without any electricity?" were questions left to be something of a mystery for the boys to work out. They were told, however, that the same "Johnny Kilowatt" that was frying the cake, that lighted the lamp, heated the coil and ran the fan was the same "Johnny Kilowatt" that magnetized the knife and picked up the pliers.

To prove the connection between the stove which would not burn the newspaper and the electromagnet, iron filings were dropped on a glass cover placed over the induction coil and immediately formed bristles standing on end that would lie flat when the current was turned off and spring into shape when the switch was closed. Not only was it possible to grow hair on the glass, but "Johnny" seemed to work equally well through paper or a board.

A table containing many other appliances, such as a radio equipment, battery, electric rodent destroyer, electric bells, fans, heaters, and so on was used to show how useful "Johnny Kilowatt" can be.



General view of laboratory where demonstrations were made (left). Johnny Kilowatt (center). Demonstrating to the boys how eggs can be fried through a sheet of paper (right).

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

Substation Operators Are Systematically Trained Definite Instruction Program, Care in Selecting New Men, and Accurate Service Records Make for Efficiency

By L. L. DYER, Superintendent of Substation Operation, Southern California Edison Company, Los Angeles

Substation operator:—the man who can operate and maintain his station in such a manner as to deliver continuous service to the company's consumers.

In an organization where a great many such operators are required the best results usually will be obtained by starting with raw material. Bright young men who have had at least high school education or its equivalent are more easily moulded to fit requirements. A man who has been trained elsewhere is inclined to hold back on the grounds that, "We didn't have to do it that way back in Iowa."

In interviewing a prospective employee, after deciding that he is good material, it is clearly explained to the prospect that much will be required of him in hard work and study. He is told that for the average young man of today, the road seems hard and stony, but that there really is a pot of gold at the end of the rainbow for him who will apply himself. The educational course designed for the operators is outlined to the prospect, and the general policies of the organization are gone over.

After passing the medical examination the embryo operator is ready to be sent to his first station. This station is manned by a chief who has proved his ability to carry forward the policy of the department. He is capable of developing men and of inspiring in them a desire to learn more about their jobs in preparation for the positions higher up, as well as filling the one he holds a little better than anyone else.

Here the prospective operators are given their first taste of some of the

more menial tasks that are an operator's lot, such as hoeing weeds, cutting lawns and other similar and necessary work. One young man upon arriving at one of these schooling stations observed two of the operators rolling the lawn with a large roller. He asked the chief if that was operators' work and received the answer, "Oh yes, that's operating a roller." So they live and learn. The length of time spent in this schooling station depends upon the new man's previous training, education and ability to learn. The time varies from one to three months.

Here, too, the recruits are taught how to keep a station neat and orderly; how to inspect, adjust, and overhaul oil circuit breakers; clean and megger switch rack insulators; keep station reports and records; operate the switchboard and do district dispatching. Within the first three days after arriving at any station the new man is required to answer in writing a set of examination questions pertaining to the fire-fighting equipment at that station. Before standing a shift as operator he must answer another set of questions embodying the operation of that particular station. This question set includes a one-line diagram of the station wiring, telephone and water systems. By this time he also should be given a start on the regular educational course put out by the department, consisting of twenty-five sets of approximately ten questions each. These he should answer at the rate of at least one set every month. Thus he is taught to use his mental as well as his physical assets.

As operators are required on other

parts of the system, men are taken from these schooling stations for jobs as assistant operators at the larger stations or as operators of small stations. They still are more or less on probation; their work is watched carefully and their progress noted. In these positions they are standing on their own feet and are without the guidance of a station chief who is doing his utmost to develop them. It is during this stage that most of the men drop out or cease to advance and are dropped as a consequence. In this connection a record card is kept on each employee. On the face of this card is the usual history of the man as kept by most companies in some form or other. On the reverse side is kept a record of the examinations answered; the man's rating on his reliability, knowledge, willingness, initiative, ability to handle men, instructiveness, neatness, and perceptibility; and of any pertinent facts which have a bearing on his rating or his work. The back of the card thus shows his progress in his education and work and balances with the front of the card where his salary and position record are posted.

In conjunction with the educational course previously outlined, frequent meetings are held at various points on the system. These meetings are attended by station chiefs and operators who can arrange to leave their stations. These meetings serve not only to keep up personal acquaintances, but to present opportunity for the discussion of operating problems. Some very fine papers are written by the men about their work and read at these gatherings. A regular central meeting is held once a month from six to nine in the evening. In the general office building this is attended by department heads, division superintendents, station chiefs and electricians. There current operating problems are discussed, standardization of practices and material worked out and plans laid for the future. Minutes of all these meet-

NAME John Doe (Ohio) DATE OF BIRTH 1-3-97 MARRIED X WIDOW		DATE OF GRADING 2-1-22 1-18-22 1-7-21 1-1-20 1-3-19 1-1-18	
ADDRESS 1417 Hanner, Y. 18 HOME NO. AX 1065 DATE EXAMINED 10-28-21 BENEFIT FUND NO. 12648		RELIABILITY 100 20 22 23 24 25 26	
BOND NO. --- RATE BACK NO. 1763 FIRE ARMS NO. --- YES SNEEUP BADGE NO. --- CO. BADGE NO. 107		KNOWLEDGE 100 50 55 60 65 70 75 80 85	
YRS. GRAMMAR SCHOOL 8 YRS. H.S. 4 YRS. COLLEGE 4 COURSES 108-22 CUT SERVICE		INITIATIVE 100 40 45 50 55 60 70 75	
EXPERIENCE Electrician's helper 1918-19, Electrician 1919-20, Lineman 1920-21.		WILLINGNESS 100 60 62 65 70 75 80 85	
15 shares common stock 2-1-22. R.P.O.S. Scotch-Irish.		HANDLE MEN 100 40 45 50 55 60 65 70	
Wife: Ellen Doe, 1417 Hanner, L.A., Cal. Baptist.		INSTRUCTIVENESS 100 20 30 40 50 55 60 65	
OCCUPATION LOCATION DATES SALARY		NEATNESS 100 40 45 50 55 57 60 65	
		PERCEPTIBILITY 100 50 55 60 65 69 72 75	
		RATING 100	
		MISTAKES 1-21-22 Pulled hot disconnect, 15 kv.	
		CITATIONS Worked way through last two years college.	
		Always Willing to take any job which will benefit his future success.	
		EDUCATIONAL COURSES A B C D 1 2 3 4 5 6 7 8 9 10 11 12 13	
		97 98 100 96 94 100 92 98 95 95 98 100 100 98 100 95 97	
		14 15 16 17 18 19 20 21 22 23 24 25	
		96 99 100 98 100 95 98 100 97 98 100 100	
1 Station Chief Wagoner 8-1-25 150.00			
2 Station Chief Wagoner 5-18-25 140.00			
3 1st Operator Eagle Rock 9-10-24 150.00			
4 2nd Operator Eagle Rock 3-1-24 140.00			
5 Station Chief San Bernardino 8-1-23 140.00			
6 1st Operator San Bernardino 2-1-23 130.00			
7 2nd Operator China 8-1-22 120.00			
8 3rd Operator Laguna Bell 4-6-22 120.00			
9 2nd Asst. Operator Culver 1-15-22 110.00			
10 3rd Asst. Operator Culver 11-1-21 100.00			
11 Apprentice Operator Culver Employed			

Front and reverse sides of the station operators' record card used by the substation department of the Southern California Edison Company.

ings are sent to each substation on the system so that all may receive at least some of the benefit gained by those who could attend. At a general meeting held on a Saturday afternoon, eighty-one men turned out, proving the wide general interest among the operating force.

For purposes of detail supervision there are stations known as switching centers. These are headquarters for district electricians and for the dispatching of the lower-voltage stations within the district and the lines feeding out of them. Also they are used as schools where prospective operators receive their preliminary training. Relief operators for the stations in these districts also fall under the supervision of the station chiefs of these switching centers.

The average young man of today is eager to learn and wants to get some place in the world. However, he usually has not stopped to consider the fact that for everything received a price must be paid. "Cut the jazz and get down to business," is the slogan in this case. Most of the men are laying a foundation for electrical engineering. Only by jumping into the things they do not know, do they realize how far ahead is their goal. Of the many that start not so many have the courage and driving power to stay with it and go through. Some, after coming face to face with their task, turn tail and flee; some fall into a rut out of which it is difficult to raise them, but some go through. It is upon the men who do go through that the success of the electrical operating game is dependent, and it is that kind of man we are after and hope to develop in every new employee.

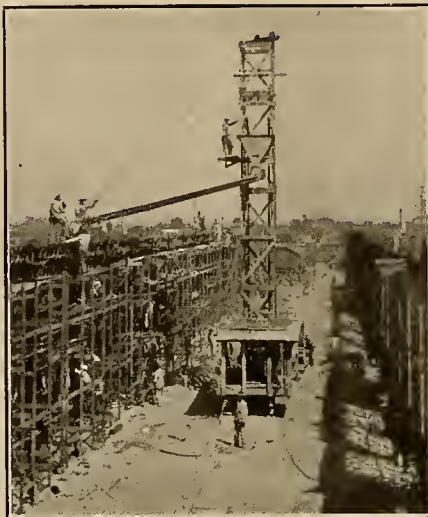
With the advent of automatically controlled stations the few old "switch pullers" will find little room to stand. The operator of an automatic station must be a man who can not only operate, for there will be very little of that, but one who also can maintain his station in efficient operating condition. Switching operations now performed by ten men will be performed by one man from a central location. Thus future station attendants must know their equipment from A to Z. They will be the operators of today who are taking advantage of the instruction and opportunity presented them and who have prepared themselves for the job which is always ahead. For theirs will be no ordinary task, but that of a skilled artisan, working with the most up-to-date equipment, in a line of work in which they will be the pioneers. They will be the electrical operating engineers of the future who, because of their knowledge and experience, will design and perfect even better equipment than they are using. To take the apprentice operator, carry him through the various stages and eventually turn out a real man who is a prospective operating engineer, is the aim of the training and opportunity being offered the men in this department.

To make these men take advantage of these privileges, offered them for their own good, is the task undertaken in this plan.

The requisite effort is great and the difficulties many. Nevertheless, the results obtained through consistent pursuit of this scheme are invaluable.

Portable Mixing and Chuting Plant Proves Economical

A portable combination concrete mixing plant and chuting hoist was devised by the San Joaquin Light & Power Corporation, Fresno, Calif., and used by them to advantage in the construction of their two warehouse buildings. Inasmuch as these buildings were over 400 ft. long and less than 50 ft. wide, it was apparent at once that a portable mixing and chuting plant would effect construction economies. The situation for the use of such a piece of apparatus was ideal because a railroad spur already had been constructed between the building sites.



General view of portable mixing plant in operation.

Standard car wheels served for the truck. Upon this was built a suitable strong timber frame to carry the mixing plant and the chuting tower. The plant itself was a $\frac{3}{4}$ -yd. electrically driven mixer. Cement, sand and gravel were distributed along either side of the track, the latter two being dropped directly from dump-bottom cars. Thus materials were so placed and handled that labor costs were reduced to minimum.

As the pouring of concrete progressed the plant was moved to successive new locations and the tower guyed. Construction speed maintained with this portable equipment could not have been accomplished by other means except at

an appreciable increase in cost. In fact, the arrangement worked so successfully that even though the buildings consisted mainly of columns and beams with thin curtain walls concrete was poured into the forms at a total cost for both labor and material of about \$14 per yard.

Remote Metering System Operates over Telephone Line

Remote metering over a distance of 60 miles has been decided upon by the Central Illinois Public Service Company. This company is faced with the necessity of recording the load of its power station near Harrisburg, Ill., at its Grand Tower station, approximately 60 miles distant. Also, it is necessary to indicate the load of both of these generating stations and a switching station located at West Frankfort which is approximately midway between the two generating stations. In addition to this, it is necessary to have an indication of the generating station loads at the load dispatcher's office at Marion, about 15 miles south of West Frankfort.

Totalizing watthour meters are employed at the generating stations. Through a system of contact these meters originate impulses which are transmitted over the company's telephone lines. By means of condensers and retarding coils these impulses are kept out of the telephone circuit, although a modification of the ringing system on the telephone lines was found to be necessary. The impulses generated by the totalizing watthour meters will be indicated and recorded on instruments known as telemeters. These meters operate in direct proportion to the speed of the impulses. This system of remote indicating and recording is known as telemetering and is a recent General Electric development. It is expected to find extensive application where it is desirable to indicate or record loads at remote points.

A Ship without a Seam.—A rivetless steel tanker with a hull as seamless as the skin of an eel has been launched at Providence, R. I. Electric welding made possible this modern marvel. Engineers investigating this new departure predict that the seamless ship will be the seagoing vessel of the future.

Energy makes the world go round; smiles remove the squeaks.



Close-up of materials handling end of portable plant used by the San Joaquin Light & Power Corporation in the construction of its warehouses. Materials were distributed directly from railroad cars.



Fig. 1—Corner pole. Note services run from same pole without any complications. Three-wire secondary.

Vertical Secondary Construction Replaces Crossarms

By R. S. DANIELS, Assistant Engineer, California Oregon Power Company, Medford, Ore.

Growth in load due to the increased use of electric ranges and appliances made necessary the extensive rebuild-



Fig. 2—Dead-end pole. Note services run without additional fixtures. Three-wire secondary.

ing of the distribution system of the California Oregon Power Company in Medford, Ore. Before proceeding with the reconstruction work a survey of requirements and a study of the different methods of supporting secondary conductors were made. This was done in order that the most serviceable and economical methods might be used.

As a result of this study the general use of vertical racks for the support of secondary distribution lines was decided upon. The initial cost is somewhat less than for crossarm construction and the life of a steel rack is much greater than that of a wooden crossarm. Furthermore, steel racks are neater in appearance and tend to eliminate the usual network of crossing and recrossing wires and keep the poles clear. In running service wires the different phases do not pass over each other.



Fig. 3—Four-wire secondary distribution showing ease of taking off corner tap.

Following the decision to use this type of construction specifications were made up to insure standard applications. The heaviest type of rack is used and in nearly all cases an extension bracket is used, making the distance from the center of the pole to the conductors 15 in.

Only one set of secondary leads is run on any given pole line and they are run on the same relative side of the pole throughout the run. For all tangent runs the wires are tied on the outside of the insulator spools. The neutral (grounded) of all secondary mains is carried at the top position because in this position it acts as a guard and prevents a fallen primary wire from coming into contact with the ungrounded secondary conductors. At corner points where the length of secondary mains is no more than two spans either way from the corner it is customary to dead end the leads in both directions at the corner. All dead ends are made up with racks and the dead end itself is made on bare copper and soldered to prevent creepage of the makeup.

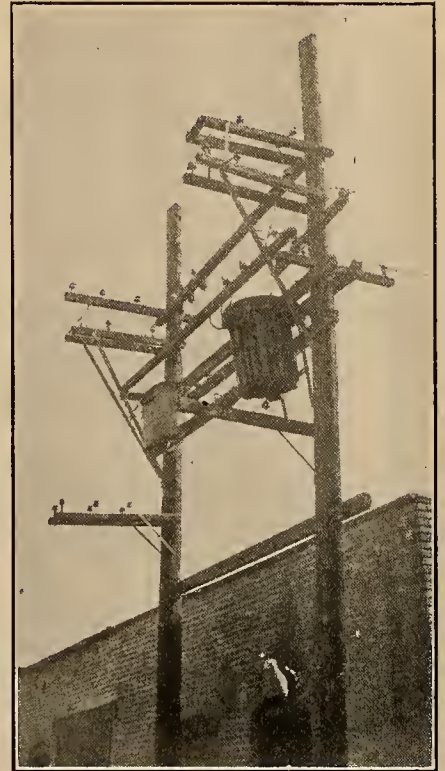


Fig. 4—Old style pole-top distribution transformer installation showing the comparatively complicated and unsightly construction. Compare with Fig. 5.

When the first racks were being installed the linemen did not like them, due mainly to the fact that their use was unfamiliar. This opposition, however, was short lived. Linemen now are boosters for this type of construction.

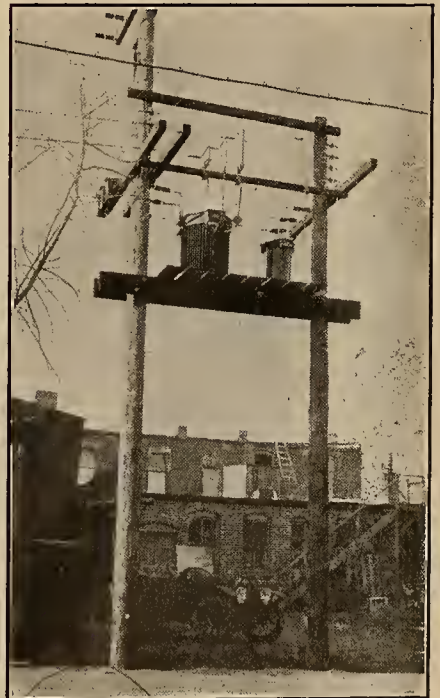


Fig. 5—New type pole-top installation of distribution transformer for light and power service. Compare with the old type station shown in Fig. 4. The transformers are connected 3-phase, open delta giving 220-volt power service and have a mid-point tap on the larger unit which gives two 110-volt lighting circuits. The angle from which the picture was taken makes it appear as if there were some confusion of secondary connections above the larger transformer which, of course, is not the case.

IDEAS FOR THE CONTRACTOR

Electrical Estimating for the Contractor — VI(a)

Modern Electrical Installation in Well Designed Plant of Furniture Manufacturing Company

By J. R. WILSON*, Engineering Department, Los Angeles Electric Works

The new factory of the White-Smith Furniture Manufacturing Company is an example of modern plant layout, on the basis of utilizing all available floor space with maximum economy in operating cost.

In designing this plant the owners spent a great deal of time in analyzing the future possibilities of trade expansion for their product. With this idea in mind they made their plant layout as flexible as possible to meet changes which might arise. This concern manufactures a high grade of bedroom furniture and sells its product at all points on the Pacific Coast, as well as in Hawaii, Texas and some of the eastern markets.

The general scheme of the plant layout is based upon the raw product of walnut, mahogany and other lumber entering the plant from the rear of the building where the stock piles are located. After the lumber is passed

through the various machines for fabrication, it continues on to the assembling and cabinet-making departments where the different parts are assembled into the completed piece of furniture. After passing inspection for defects in material or workmanship, the product passes on to the spraying and finishing rooms and then to the drying rooms.

After the finish has dried thoroughly the product is inspected again for finish defects, and if it passes this inspection, the finished article passes on to the packing and shipping department.

This scheme adheres very closely to the recognized standard as practiced by the large eastern manufacturers. It is known as the straight-through routing method of manufacture. The raw material enters the plant at one end and never turns back until it leaves the other end in the form of finished product. This makes for economy of floor

space and operating cost and also increases plant production.

It is interesting to note that the percentage of rejects on the final inspection is very small. This is due to the fact that the plant owners are men of wide experience in their line and each employee has become imbued with the plant slogan: "We must strive to make good furniture so well and so cheaply that we will have steady employment."

The plant owners designed their building with this operating scheme in mind, with the result that the structure is of the one-story design, of the long and narrow type of building. The walls are of brick with heavy wooden beams and posts supporting the roof. The building is so designed that an additional story may be placed without any changes being made in the present structure and without stopping present plant operation.

Before starting construction a floor plan of the building was tacked to a board, and pieces of cardboard of proper shape and scale size to represent each machine were provided. The owners spent many months of study in the placing of these cardboard "dummies" before the plant layout finally was decided upon. After the location

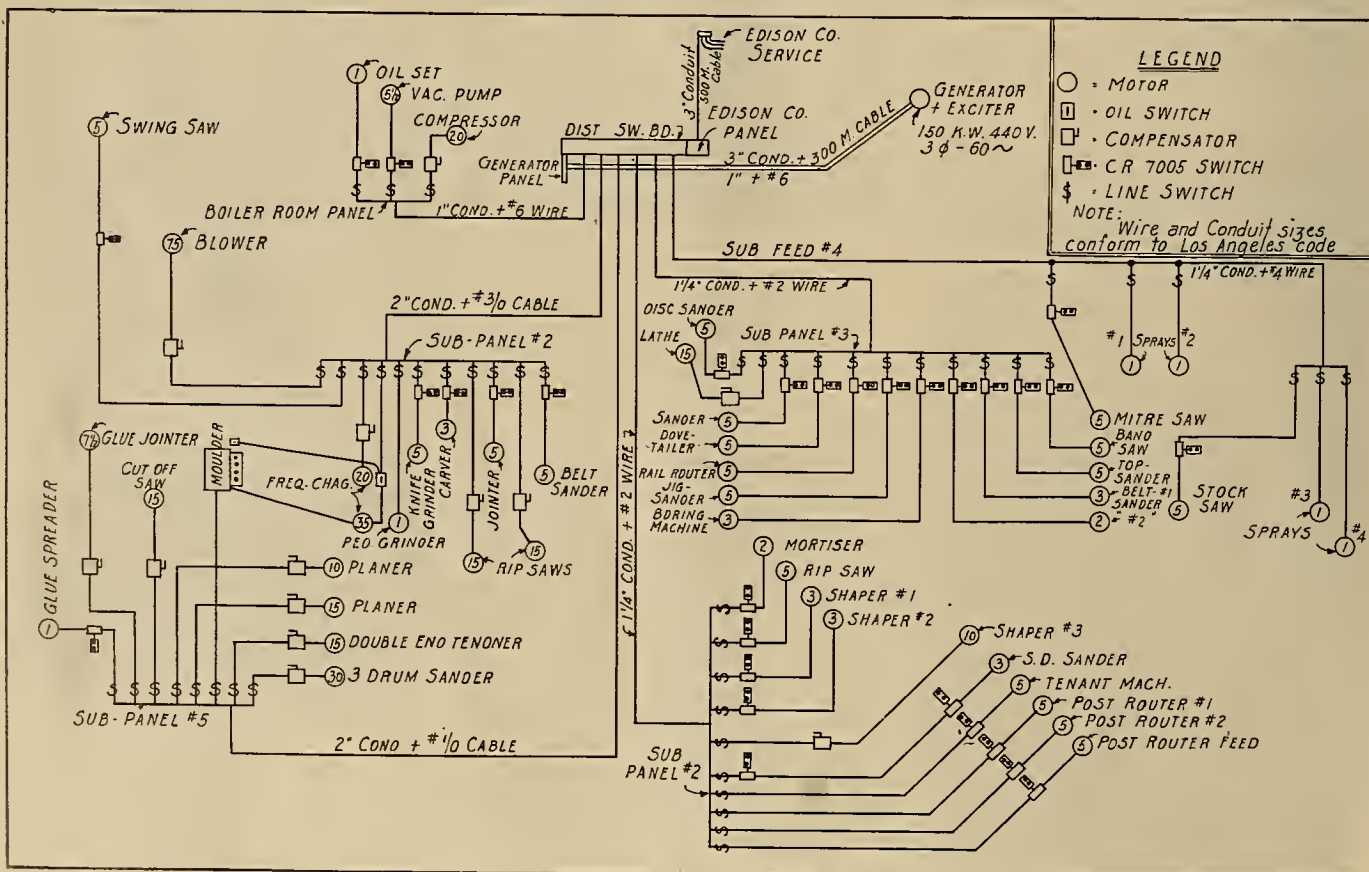


Fig. 1.—Schematic diagram of wiring layout in the plant of the White-Smith Manufacturing Company.

of each machine had been decided, the floor plan was revised to include the machinery set-up and the plans were submitted to the electrical contractors for estimates.

This plant is located in "the central manufacturing district" of Los Angeles and the policy of the district is to provide the building for each manufacturer and install the lighting equipment. The owners retained Holes & Sanborn, electrical and mechanical engineers of Los Angeles, to supervise the power installation in this plant.

No electrical plans or specifications were provided; each contractor was required to submit his own layout and specify the type of equipment he proposed to furnish.

The successful bidder was awarded the contract on a "time and material basis," with the guaranteed maximum cost limit.

There were two very interesting items in connection with this job that do not appear in most jobs of this nature. The first was the use of a "partial load" isolated plant working in conjunction with the regular source of current supply from the Southern California Edison Company.

One of the problems with which this firm was confronted was to obtain an adequate and continuous supply of properly kiln-dried lumber of the quality which enters into its product. To overcome this handicap and to insure a practically unlimited supply of raw material a complete steam dry kiln was included in the plant layout. To provide for possible future needs the boiler capacity was made considerably larger than the present plant requirements would warrant.

After the local power shortage of last winter with its attendant inconveniences, the owners of the plant decided to make use of this surplus steam capacity by installing an auxiliary steam-driven generating set, this as a means of reducing their power bills and safeguarding themselves against any possible future power shortage or outage.

An addition was built to the original boiler room and a used engine and generator were purchased and installed

in this building. This set consisted of a G. E. 150-kw., 440-volt, 60-cycle, 600-r.p.m. generator with built-in exciter, belt-driven by a Murray Iron Works 14 x 36 horizontal standard Corliss engine, with a 12-ft. flywheel. The Edison company service also was removed from the original location and re-installed in this new building.

The electrical contractor designed and installed a switchboard layout to include the Edison company panel, the generator and exciter equipment, and a distributing switchboard. This dis-

tributing switchboard is connected to each of the feeders so that it is possible for the engineer to tell at a glance just what the demand is on each feeder. By watching the steam gages and these ammeters a very flexible scheme of load handling has been developed. The double-throw switches were designed for very quick operation. Any feeder can be shifted instantly from Edison to generator or vice versa without "dropping the load."

Figs. 2 and 4 show clearly the arrangement of the main switchboard and generator panel. The Tirrill regulator was installed because of a load fluctuation and also because the generator set is 60 cycle. The Edison service is 50 cycle and all of the plant speeds are based upon 50-cycle operation. It is necessary to run the generator at a speed which will conform as nearly as possible with these predetermined machine speeds.

(To be continued)

1925 National Electrical Code Now Being Distributed

Copies of the 1925 edition of the National Electrical Code published by the National Board of Fire Underwriters are now available and are being distributed by the Board of Fire Underwriters of the Pacific, 914 Merchants Exchange Building, San Francisco; applications for copies should be sent to that office. It is not necessary to send in an application for copies if this has been done previously, as all back orders are being filled.

The biennial revision of the Code was performed by the National Fire Protection Association as the sponsor organization through a sectional committee of the American Engineering Standards Committee which has approved it as an American standard.

Brute!

Wife: "Judging by this article on electricity, very soon we'll get all we want by touching a button."

Hubby: "You'll never get anything that way because you never touch a button. Just look at my shirt."—Exchange.

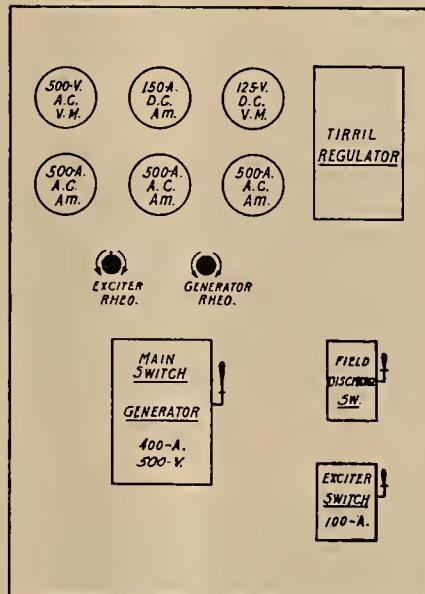


Fig. 4.—Diagram of the generator panel in the boiler room of the White-Smith Manufacturing Company.

tributing switchboard was so designed that it is now possible to operate any part of the plant on either Edison or generator as may be desired, or as the surplus steam capacity may permit.

To make this scheme of operation possible a separate conduit line and feeder was installed to each sub-power panel in the plant. At the main switchboard each of these feeders is connected to a double-throw switch. An

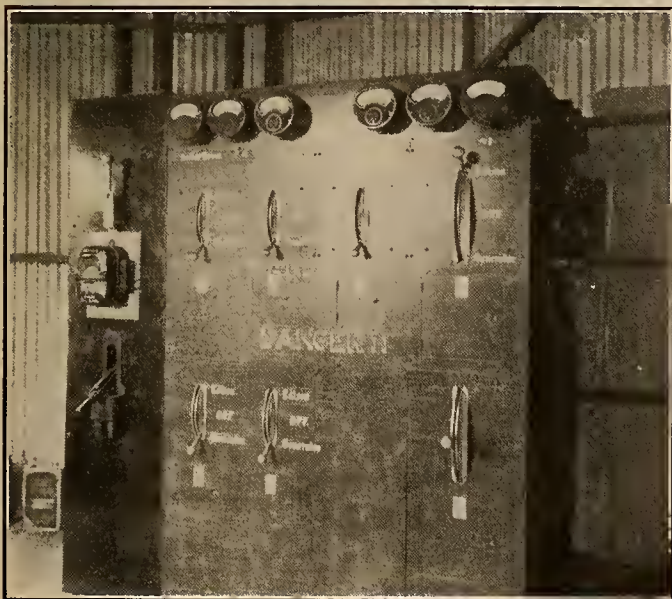


Fig. 2.—Distributing switchboard showing the Edison company panel on the left. The generator panel may be seen on the right end.



Fig. 3.—Sub-panel 1. Sub-feeder 1 from the main switchboard may be seen on the right.

BETTER MERCHANDISING

Spooky Window Display Stops Hallowe'en Shoppers

**Atmosphere Created by Corn Shucks, Pumpkins, and Witches
Makes Effective Display Background for Appliances**

An armful of corn shucks, a couple of pumpkins, a paper witch, and some electrical merchandise well displayed, these in original arrangement, contrived to stop Hallowe'en crowds who passed the windows of the Newbery Electric Corporation of Los Angeles during the latter days of the harvest time.

At a cost of \$5.50, of which the chief items were two pumpkins and an armful of corn purchased from a local farmer for \$2.50, the entire display was arranged. That it was a most attractive one was vouched for by the comments heard after its display.

For a background the green corn stalks were used, being held in place by a piece of fine magnet wire, and a picket fence was built in front of the corn. The fence was left unpainted and had a gate swinging open from it at the center of the window. The open gate provided an appropriate place for an advertising poster showing a witch riding off on a broom, with the caption, "Let her ride off with every broom in town," the inference being that vacuum cleaners might well take up the sweeping of the city.

A large witch was made out of cardboard and made to ride on a vacuum cleaner, both suspended from the ceiling. In the witch's eye a small electric automobile lamp was fixed, and by means of a "Skeedoodle" plug was made to blink. The lamp was red and was operated from a small transformer.

From the reflector-type electric heaters, streamers of black and orange were run up to the top of the window. The heaters themselves had red lamps in them instead of heating elements, and all were lighted. Three black paper cats, obtained at a stationery store, were set to lean against the fence. A few papier-mache false-face pumpkins, and the real pumpkins illuminated, paper bats, corn husks and cobs, made up the other articles of decoration.

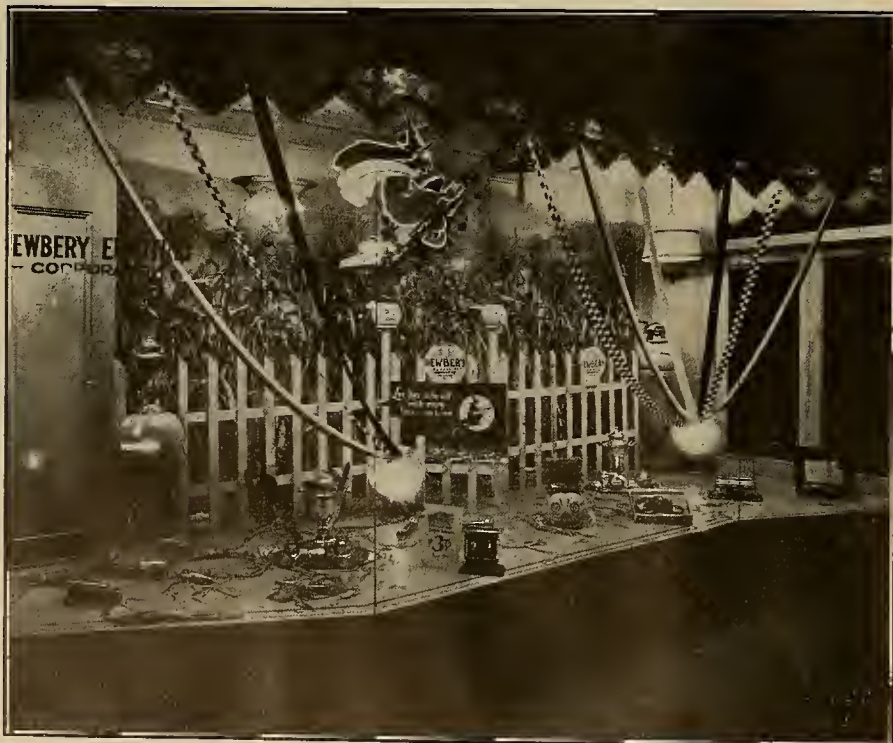
Muslin Covers for Appliances Protect from Scuffing

A careless broom, a too ambitious rearrangement of appliances on the floor, a thousand things which may happen in the best intentioned day

about a stock room, take toll of the paint which should be so shiny and new on appliances before they are sold. To many dealers the only safeguard is to leave the appliance crated until it is de-



Not a shroud, merely an ingenious idea used by the Pacific Power & Light Company of Portland, Ore., to keep washing machines and other appliances from being scuffed while in stock and uncrated.



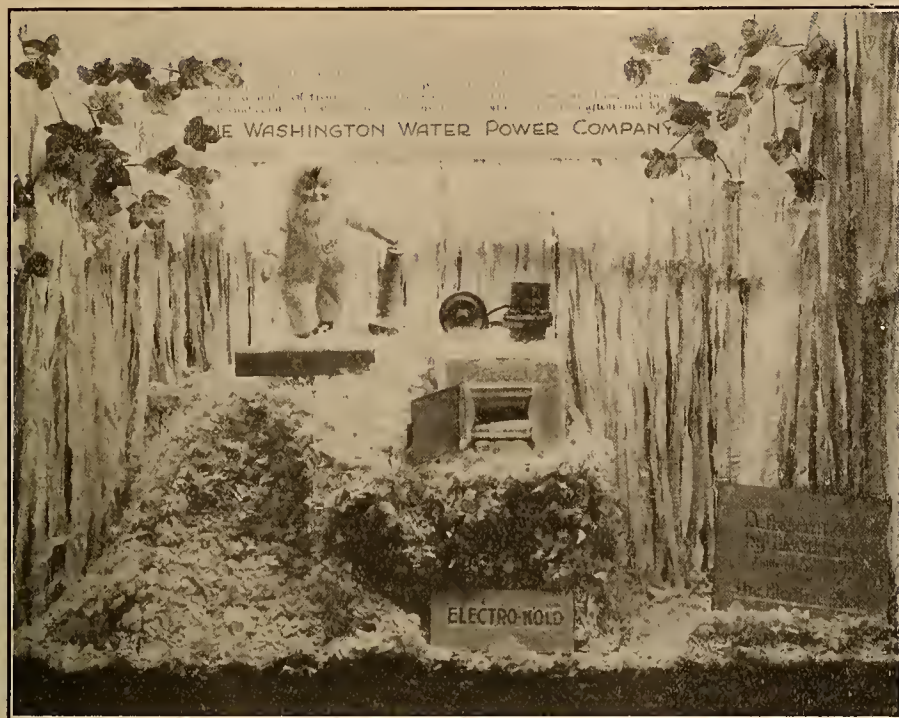
Attractive Hallowe'en window arranged at small expense by the Newbery Electric Corporation of Los Angeles. This window stopped passersby to rivet their attention upon electrical merchandise.

livered, taking all chances with the demonstrator only.

To make more flexible its stock handling and to protect its appliances from the scuffing and bumps that sometimes occur in spite of precautions, the Pacific Power & Light Company of Portland, Ore., has evolved a handy "smock" with which to cover its larger appliances while in stock.

This covering consists of unbleached muslin cut and sewed to conform with the shape of the appliance to be protected. Taking that used for the covering of washing machines as an example, about two yards of muslin serves the purpose. Similar covers are used to protect electric ranges, ironers and other large appliances.

By using covers of this kind it is possible to uncrate the appliances in the storeroom and in case an appliance has to be shown to a customer in there, all that is necessary for showing is a quick removal of the cover and the appliance is in presentable condition for exhibition. This protection not only improves the appearance of the storeroom and of the appliance for display, but prevents shop wear and saves many a knock that would take off paint, according to the experience of that company.



This chilly scene warmed up many prospects for electric refrigeration when it was put on display in the windows of The Washington Water Power Company, at Spokane.

Realism and Fancy Combine in Refrigerator Display

That well known and much advertised thing, "the power of suggestion," was applied with success to a recent window display of electric refrigerators arranged by The Washington Water Power Company, in Spokane, Wash. The thing suggested, the entire theme of the display, as it were, was icy and frigid, entirely a proper atmosphere for electric refrigeration.

A small Eskimo Kewpie doll provided the human element in the scene which the window was arranged to depict. It stood high upon a bank of realistically arranged paper snow and was set off by streamers of paper icicles. In the center of the stage was placed a frost tank of an Electro-Kold refrigerator, the compressor being concealed behind the window. The tank became heavily frosted and conveyed an idea to those who passed the window of the refrigeration possible by the use of electricity.

Official Returns from Electric Refrigeration Survey Trip

Covering a period of three months and an itinerary of more than 12,000 miles through the United States and Canada, S. M. Kennedy, vice-president in charge of business development and public relations, Southern California Edison Company, Los Angeles, has completed a survey to date of the development of mechanical refrigeration for domestic purposes.

Mr. Kennedy believes that the central station company contemplating entrance into this field should make itself familiar with the following five basic factors: type of machine, cost of servicing, merchandising methods, conditions of sale, and financing of time contracts.

"Since every central station com-

pany is anxious to get on its lines additional load without additional expenditure, this type of business is going to be most cordially welcomed by the industry," states Mr. Kennedy in his report. "Many applications for service are received which the company is compelled to refuse because the expense of carrying the service lines to the applicant is out of proportion to the anticipated revenue. The installation of an electric refrigerator in the home or homes of such applicants will in many cases enable the power com-

pany to build the extension and give the desired service with mutual benefits."

Mr. Kennedy is particularly enthusiastic over the usefulness of electrical refrigeration in the rural districts where the householder who now wishes ice must drive to the nearest town for it and act as his own deliveryman.

"When it is considered," the report concludes, "that the electric way is more reliable, more convenient and more sanitary than the old-fashioned method of obtaining refrigeration, and at the same time is as low or even lower in operating costs, it is not difficult to visualize the wonderful possibilities which lie ahead in the field."

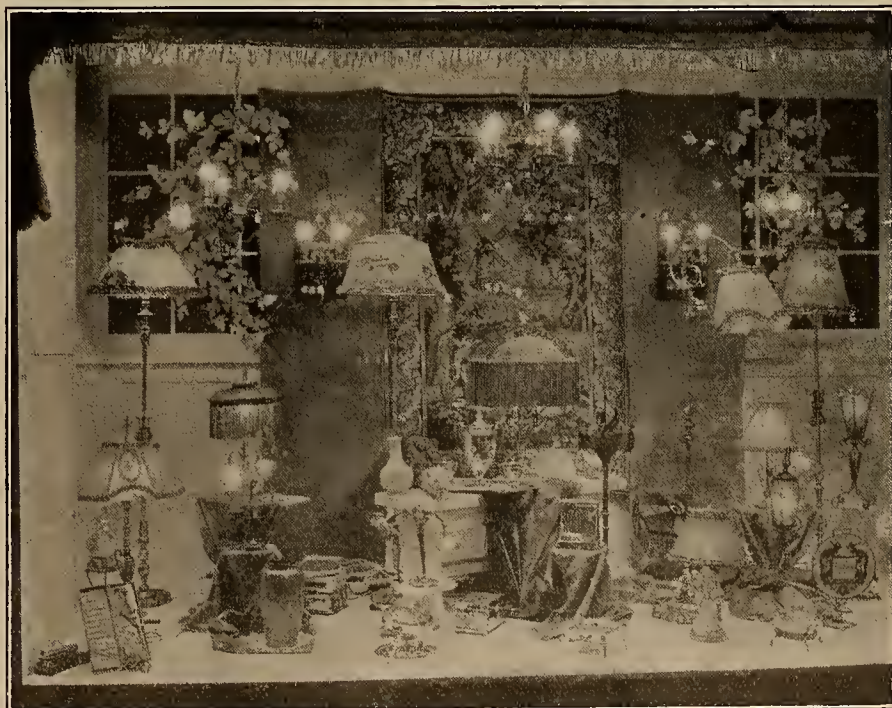
San Diego Department Store Has Large Electric Section

Holzwasser, Inc., one of the largest department stores of San Diego, Calif., has opened a fully equipped electric appliance department, C. H. Robbins, formerly of the Hurley Machine Company of Los Angeles, in charge.

This department is located on the first floor, with direct street entrance and a large show window attractively decorated. The store makes a feature of servicing all electrical goods sold by it and has a corps of sixteen men in the sales and service section of the electrical department.

Charles Holzwasser, president of the concern, is authority for the statement that the electrical business of the store is excellent and that the volume of sales, particularly in vacuum cleaners and washers, has exceeded all expectations. It is his present plan to increase the floor space more than double that now allotted to the electric appliance department.

Merchandising of electrical appliances by the Holzwasser department store closely followed its establishment of a radio sales department.



Prize-winning window of the Electric Furnishing Company, 322 Sprague Avenue, Spokane, of which F. A. Jahnke is proprietor. This display took first prize in the electric store class in the contest for the best merchandising window in the United Fall Exposition, Spokane, Sept. 3-4, 1925

NEWS OF THE INDUSTRY

Selling and Public Relations Stressed at Wyoming Utility Association Meet

For the first time in the history of the organization, commercial department methods and the necessity for efficient selling whether of energy, service, public relations or merchandise, were discussed and emphasized at the recent convention of the Wyoming Utility Association held at Cheyenne, Nov. 16-17.

Along with the commercial discussion two other ideas were stressed: first, the change in attitude on the part of utility companies during the past ten years, and, second, the demand that every employee of a utility realize his responsibility to the company and to the public in the nation-wide movement to improve public relations.

One speaker urged dismissing the employee who fails to sense his responsibility rather than transferring or demoting him. The need of utility executives to serve as examples and inspiration for employees was demonstrated as a prerequisite to such action, however.

While attendance at the convention was not as representative as at the Casper meeting a year ago, those present expressed their appreciation of the constructive program which was provided and outlined plans immediately which would interest absent members in the divisional N.E.L.A. midwinter meeting in Denver in December and the next meeting of the Wyoming association. A large Colorado delegation was present and pledged its interest and support.

The convention was opened auspiciously by Governor Nellie Tayloe Ross in an address of welcome that included a keen insight into public utility problems and a statement of confidence on the part of the state administration in its relations with the various utilities through the commission. In his welcoming address H. B. Henderson, Jr., president Cheyenne Chamber of Commerce, stressed the value of customer-ownership of utility securities as observed from his own experience.

The Wyoming association boasts of the membership of a motor bus company which operates in Casper and the adjoining oil fields. W. B. Cobb, manager of the Casper Motor Bus Line Company, read a paper on "The Progress of the Motor Bus as a Public Utility," and injected a new note in the electrical, gas, and telephone gathering by showing some of the obstacles encountered by a motor bus company which, while classified as a common carrier, was not fully legalized or respected as a public utility. Present conditions in Wyoming seemed to indicate under-regulation in this respect rather than over-regulation, in Mr. Cobb's opinion.

The three fundamental reasons for merchandising on the part of a utility, and especially of central stations, was explained by G. B. Buck, superintendent of electric sales, Public Service Company of Colorado, with headquarters at Denver. He said that public relations, gross merchandise sales and revenue increases demand efficient merchandising. Charts illustrating and demonstrating the various points of the talk were shown and included one showing that central-station selling methods at the present time are only forty per cent efficient. The interest manifested in this subject led to further discussion following the luncheon and business meeting which concluded the convention.

Related to the commercial discussion was the part which advertising is playing in the utility business. "Making Advertising Do its Job" was the subject of the paper presented by Joseph E. Moorhead, assistant publicity director, Mountain States Telephone & Telegraph Company. On this subject the work of the Rocky Mountain Committee on Public Utility Information and the impetus which it has given to all forms of utility publicity in the Mountain region was commended highly.

One of the features of the social program was the entertainment arranged at Fort D. A. Russell, adjoining Cheyenne, the first night of the convention. It consisted of a program of boxing bouts. A number of women attended.

C. L. Titus, state manager for the telephone company and president of the association, presided at the meetings and arranged the convention entertainment program. In the annual election James Potts, manager of the Rawlins Electric Light & Fuel Company, Rawlins, Wyo., was named to succeed him. James J. Withrow, manager of the Sheridan County Electric Company, Sheridan, Wyo., and W. D. Johnston, general manager of the Mountain States Power Company, Casper, Wyo., were elected vice-presidents. H. C. Chappell, Midwest Public Service Company, Casper, was elected treasurer. The secretary of the association will be appointed later by the president. The officers along with R. E. Richardson of Lovell, retiring treasurer, constitute the new executive committee.

Mrs. C. L. Titus served as hostess to the ladies attending the convention.

Japanese Utility Plans New Development Project.—The Ujigawa Electric Company of Japan is contemplating a new hydroelectric development project, according to Denkinotomo. Plans include the construction of Ohmine power

house with a capacity of 16,000 kw., a plant on the Takatoki River to generate 1,064 kw., and the Kiwada plant of 735-kw. capacity. The total construction cost is estimated at 7,000,000 yen.

Julia Groo's Prize Electric Home Is Exhibited in Portland

Through the courtesy of Julia Groo, eighteen-year-old high school student of Portland, winner of the National Home Lighting Contest conducted throughout the United States last year, the \$15,000 prize home won in that contest was thrown open to the public as an electric home exhibit on Nov. 1, 1925. On Sunday, the opening day, 1,900 visitors were received and conducted through the house, and many more, discouraged at the apparent size of the crowd, went away without going through, expressing their intentions of returning at another time. It is planned to keep the house on exhibition afternoons and evenings for two or three weeks or until practically everyone desiring to inspect it has had the opportunity to do so.

This is the first electric home publicly displayed in Portland and machinery for this exhibit was set in motion early this year, soon after the announcement of the winner of the contest, when Miss Groo expressed her intention of having the home built in Portland. Arrangements for the electrical features of the home were made by the same committee that conducted the Portland Home Lighting Contest (Journal of Electricity, Oct. 15, 1924, p. 306) and is composed of representatives of all branches of the electrical industry, headed by F. H. Murphy, illuminating engineer, Portland Electric Power Company. No effort or expense has been spared to equip the home completely with electrical conveniences, among which is complete equipment for heating electrically. A description of the electrical features of the home, illustrated by photographs, will appear in a later issue.



Prize home of Julia Groo, Portland high school girl, given to her as the first prize in the National Home Lighting, Educational Essay Contest of last year. The home recently was opened by Miss Groo for public inspection, making Portland's first electric home exhibit.

Mountain States Power Company Inaugurates House Organ

A publication devoted to the interests and activities of employees of the Mountain States Power Company, Tacoma, Wash., has been started by that company, which is a Byllesby holding, and the first issue was distributed Nov. 1. The new paper has not been named, the first number carrying a request that employees submit suggestions for a permanent title.

This house organ will not be issued on regular schedule, but will be published whenever sufficient news matter is found available.

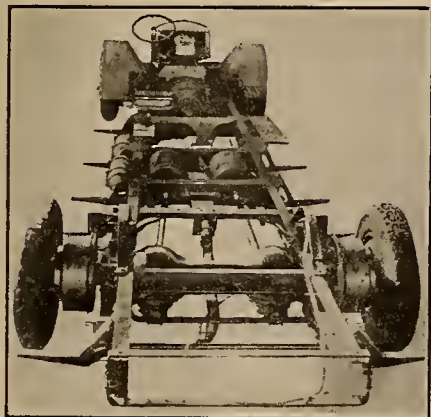
Other Western companies, operated under the direction of the Byllesby Engineering & Management Corporation, that issue publications for their employees are the San Diego Consolidated Gas & Electric Company and the Western States Gas & Electric Company, Stockton, Calif.

Gasoline-Electric Motor Bus Put On Run by L.A. Railway

A double-deck bus, driven by electricity, with generation of that electricity by means of a gasoline engine, is to be tried out by the Los Angeles Railway, according to announcement made by that company recently. Smoothness of operation, especially as to acceleration and control in traffic, is claimed for this new type of bus.

The bus is of the Fageol type with General Electric drive. To all appearances a gasoline car, the gas engine is used to turn over a generator and exciter direct-connected to the crankshaft and placed where in ordinary cars the transmission usually is located. Instead of gear shift, the bus is accelerated by means of a stepped switch, whereby more current is fed to the two electric motors which drive the car. These motors are located near the center of the chassis.

Advantages claimed for this type of drive are higher rates of acceleration and schedule speeds, and greater comfort for passengers, since the electric drive is silent in operation and the jerking of gear shifting is eliminated. Skidding is prevented by the two-motor drive, which eliminates the mechanical differential. Maintenance costs are low, it is claimed, as the engine makes 20 per cent fewer revolutions when running under city conditions.



Chassis of gasoline-electric motor coach, in which the gasoline engine turns a generator, the current from which drives the bus by means of two electric motors shown at the center of the chassis.

Plans Completed for Execution of Red Seal Plan in California

Progress is being made in the execution of the Red Seal Plan in California. The first step essential to this was the division of the state into districts, in each of which a committee has been appointed to be held responsible for the conduct of the program within that district.

In determining upon the boundaries of these districts two factors were given consideration: first, the division into power company territories; and, second, the boundaries of electric leagues and clubs which now are functioning over a large percentage of the state. Such consideration made possible the division of the state into twenty-five clearly defined districts. A letter then was addressed to the sales manager of each power company asking him for a list of those representatives of his company whom he would be willing to authorize and instruct to accept a committee responsibility in this program.

With the replies from the sales managers at hand, twenty-five committees, one for each district, have been selected, constituted of one or more power company men and the contractor-dealer president of the electric club or league functioning in that district. These committees have been named tentatively and now are to be re-submitted to the power companies for their final approval.

With practically half of the population of California occupying the metropolitan areas of San Francisco and Los Angeles, it is apparent that the proper execution of the program in these two centers offers the greatest problem. A committee therefore has been appointed in San Francisco under the chairmanship of H. M. Crawford, sales manager of the Pacific Gas and Electric Company, and a similar committee appointed in Los Angeles under the chairmanship of W. L. Frost, general commercial manager of the Southern California Edison Company. These committees are charged with the responsibility of outlining a definite course of procedure which will permit the inspection and affixing of seals necessary under this plan to be done in the most efficient manner and with a minimum expenditure of time. The committees now are functioning, Mr. Crawford already having submitted a preliminary report of the activities of the San Francisco committee.

The legal agreement between the Society for Electrical Development and the California Electrical Bureau in the form of a license authorizing the bureau to act as the society's agent in promoting the Red Seal plan in California now has been received, together with a suggested form for use in licensing each of the twenty-five districts. With these licenses at hand and the necessary material in the form of job cards, meter stickers and owners' certificates about ready and the organization awaiting merely the confirmation of the appointments which have been made, everything is about prepared to take full advantage of the interest which has been evidenced in the Red Seal program.

The issuance of the required minimum standards a few months ago, sev-

eral stories which have appeared in the Journal of Electricity, and the announcement of the purpose of the plan at the San Diego convention of Electragists, Southern Division, and the Eureka convention of Electragists, Northern Division, all have awakened an interest which has contrived, despite every effort to hold it in abeyance, to result already in demands for inspection and material for a number of Red Seal homes.

The plans also call for the appointment in the near future of an advertising committee whose responsibility it shall be to determine to what extent display advertising shall be utilized in promoting the Red Seal plan, to prepare series of contractor advertisements to be made available to contractors in either mat or plate form for use in their local newspapers, and to prepare and place publicity stories wherever possible, including those media used for display advertising, the Journal of Electricity, and the house organs of the power companies. The Southern California Edison Company already has on hand a fully prepared series of Red Seal advertisements for use in newspapers throughout its territory as soon as the program is launched.

A finance committee composed of W. L. Frost, chairman, D. E. Harris, E. O. Shreve, H. L. Harper, and K. E. Van Kuran, was appointed at the last meeting of the advisory committee for the purpose of preparing a budget covering the cost of the bureau's planned operations for 1926 and to raise the funds necessary to meet this budget. This committee now has a budget in the course of preparation.

By means of regular monthly reports of the progress of the Red Seal plan the bureau will be in a position to present for the frequent and periodic consideration of its contributors concrete evidence of the returns of their investment in the bureau.

"White-Way" Lighting in Provo, Utah, Business District

The new "white way" of the business district of Provo, Utah, formally was placed in operation early in October, and the district now claims to rank among the best lighted in the country. Among the prominent guests present at the inauguration of the new lighting system were George H. Dern, governor of Utah, a number of city officials of other Utah cities, and several members of the General Electric Company's Salt Lake City branch office.

The new lighting system, officially known as lighting district No. 1, extends from First East to Fifth West Streets on Center Street. There are ten standards to the block, five on each side of the street, upon each of which is mounted two 1,000 c.p. incandescent Novalux units. This gives a total of 20,000 c.p. a block, or 50 c.p. a linear foot of street, and this intensity compares favorably with that of American cities of a population of 30,000 or more. There is a total of 124 lamps, of which 36 will burn all night and 88 will be turned off at midnight each night.

Ice Men Consider Sale of Electric Refrigerator to Offset Losses in Ice Business

That the ice men are concerned deeply with the growth of electric refrigeration in the homes of the country was reported to the merchandising committee of the Commercial Section, Pacific Coast Electrical Association, at its recent meeting in San Francisco, by C. C. Crawford, industrial power engineer for the Portland Electric Power Company. Mr. Crawford had attended the ninth annual convention of the National Association of Ice Industries held in Los Angeles, Nov. 10-14.

Mr. Crawford reported the general attitude of the ice men as that of being fully awake to the prospect of losing a great volume of ice business in the United States due to the electric refrigerator. A special report on household refrigeration was presented by A. Hardgrave, chairman of a committee studying the subject from its effect on the ice industry.

The committee reported that there were 200,000 electric refrigerators in use in homes in 1925, and that the ice manufacturers lost an annual gross revenue of \$10,000,000 from their use. It also estimated that by 1930 the annual loss in revenue would reach \$70,000,000.

Opinion was divided as to what steps ice men should take to offset these losses, although it was generally felt, Mr. Crawford said, that the electric refrigerator had come to stay and that it was a matter of adjusting the ice business to that uncomfortable fact.

The committee recommended a nation-wide advertising campaign by the establishment of local home economic departments similar to those found successful by light and gas companies, and extensive local and national advertising to develop a more extensive use of household refrigeration, by whatever means, ice or electricity. In the latter connection it was pointed out that steps are being taken to seek the co-operation of the National Electric Light Association on a co-operative advertising campaign for refrigeration in which the increase of business would reflect to the benefit of both electric utilities and ice companies.

Some ice manufacturers felt, according to Mr. Crawford, that the best means of combating the losses would be for ice companies to enter the field of domestic electric refrigeration sales. A company of Portland, Ore., already is embarking upon such a plan, Mr. Crawford reported. It is felt that the profit from the sales of electric machines will offset the lost revenue from ice sales for many years.

A fear was expressed in the merchandising committee meeting of the Pacific Coast Electrical Association that the servicing of electric refrigerators would be passed on to the power companies, but reports from representatives of refrigerator manufacturers showing the extensive steps being taken by such manufacturers to provide satisfactory servicing for their products would tend to show that the situation will be cared for.

Mr. Crawford also reported that ice cream manufacturers and soft drink

supply companies were making plans to install electric refrigerators for their customers, a move which would cut down further the ice consumption in many quarters.

Electric Locomotive Outpulls Two Steam Competitors

Demonstrating again the superior qualities of the electric locomotive over those of steam locomotives the Chicago, Milwaukee & St. Paul electric locomotive No. 10253 outpulled two freight locomotives of the same line at a test staged in the Cascade Mountains in October. While these contests have been staged before, they always are interesting and generally the conditions under which the tests are carried on are different. Such is the case in this instance.

One of the two freight locomotives was a 150-ton type C steamer having eight driving wheels. The other was a 278-ton Mallet compound with twelve driving wheels. A combined normal tractive effort of 57.6 tons was available from the total weight of 428 tons for the two steam locomotives. In addition to this normal tractive effort was added nearly 14 tons due to the approximate 2 per cent grade which they had in their favor. This made a total pulling force of over 71 tons, normal rating, for the two steamers.

The electric locomotive was a standard bi-polar 3,000-volt gearless passenger locomotive having a total weight of 265 tons and a normal tractive effort of 68.5 tons. Twelve driving motors, the armatures of which are mounted on as many axles, furnish the motive power. The driving wheels are

44 in. in diameter, and the total overall length of the locomotive is 76 ft. Five of these electrics are in operation on the Coast division of the railroad between Tacoma and Othello in the state of Washington.

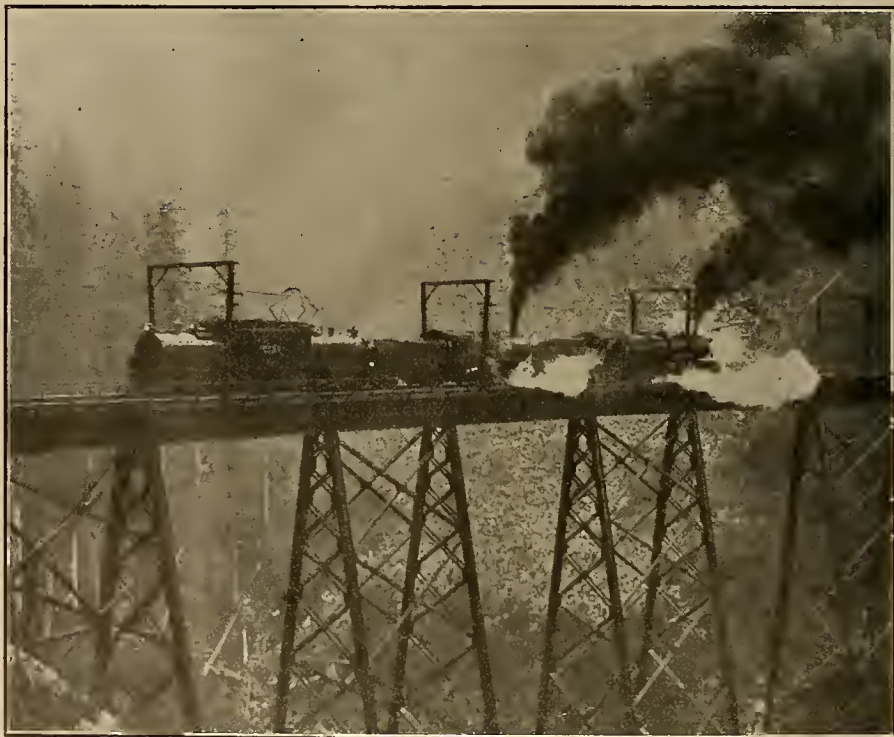
This particular demonstration was staged not as a test by the railroad, but at the request of the Universal News Reel Service.

California Byllesby Companies to Merchandise Appliances

With the leasing of the building adjacent to its present offices in Stockton to provide space for a high-class appliance sales room, the Western States Gas & Electric Company is preparing to be the first of the Byllesby companies in California to enter the appliance merchandising field. The entrance of this utility into merchandising will be followed at an early date by the remaining Byllesby companies in the state, which include the San Diego Consolidated Gas & Electric Company, the Coast Valleys Gas & Electric Company and The California Oregon Power Company.

The Western States Gas & Electric Company will carry a complete line of gas and electric appliances, and its merchandising plans include an extensive load-building campaign. The Stockton store will consist of a 100-ft. corner location in the heart of the business district that will be one of the most modern in the West. Following the establishment of a store in that city, stores will be established in Richmond and Eureka, Calif., if conditions warrant. Appliance merchandising will be under the direction of the company's commercial department, of which H. K. Griffin is the head.

It is expected that all Byllesby companies will be merchandising actively by shortly after Jan. 1, 1926.



Spectacular tug-of-war staged in October near the western portal of its Cascade tunnel by the Chicago, Milwaukee & St. Paul Railroad

N.E.L.A. Women's Committee Visits Salt Lake

A delegation of members of the Women's Committee of the Public Relations Section of the National Electric Light Association were guests of the Utah Power & Light Company at Salt Lake City on Oct. 22. The following women, each of whom is chairman of a district in the Northwest, were in



Members of the N.E.L.A. Women's Committee of the Public Relations Section, Northwest Division, who visited Salt Lake City recently. Top row—Miss Esther Miller, Miss Edna Comstock, Miss Stella Dorgan, Miss Marguerite Butler, Miss Charlotte Cummings, Mrs. Nina Johns, Mrs. A. W. Angell, Miss Ellen McCurdy. Lower row—Mrs. Evva O. Moyle, Miss Nelle Duffey, Mrs. L. A. McArthur, Miss Mary K. Walsh, Miss Dottie Southwick.

the party: Miss Ellen McCurdy, Pacific Power & Light Company, Walla Walla, Wash.; Mrs. A. W. Angell, Northwestern Electric Company, Portland; Miss Esther Miller, Grays Harbor Railway & Light Company, Aberdeen, Wash.; Miss Dottie Southwick, Pacific Power & Light Company, Portland; Mrs. Nina Johns, Idaho Power Company, Boise; Miss Mary K. Walsh, The Washington Water Power Company, Spokane; Miss Edna Comstock, Oregon Public Utility Information Bureau, Portland; Miss Nelle Duffey, Puget Sound Power & Light Company, Seattle; Miss Stella Dorgan, Mountain States Power Company, Albany, Ore.; Miss Marguerite Butler, Portland Electric Power Company, Portland; Mrs. L. A. McArthur, Pacific Power & Light Company, Portland.

Mrs. Evva O. Moyle and Miss Charlotte Cummings, of the general offices of the Utah Power & Light Company, had charge of the entertainment of the visitors. Mrs. Moyle is chairman of the Utah district.

During the morning an interesting meeting was held, during which there was a round-table discussion of matters pertaining to the education of women employees of public utilities concerning their companies' affairs in order that such women employees may be in a position to do their part in cultivating the good will of the public. The meeting also was addressed by D. C. Green, vice-president and general manager of the Utah Power & Light Company.

Monrovia to Have Light District.—A petition to install ornamental street lights on Wild Rose, Oakdale, Lime, and Lemon Avenues, from Shamrock Avenue to an alley 600 ft. north, has been approved by the board of trustees of Monrovia, Calif. Concrete posts with single globes are specified.

Recommends \$2,500,000 Utility-Bond Issue to Develop Second Skagit Unit

As the next step for further Skagit development, for which he asks a \$2,500,000 utility-bond issue as soon as possible, J. D. Ross, superintendent, of the city light department, filed with Mayor Brown of Seattle recently a report embracing the following recommendations for the extension of Seattle's municipal electric plants and system:

Construction of an extension of the railroad from the present terminus of the Skagit railroad at Gorge Creek to Diablo Canyon, a distance of four and a half miles, at an estimated cost of \$425,000.

Installation of a third unit of 25,000 hp. at the Gorge power house, increasing the output to 75,000 hp., at a cost of \$600,000. This would include additional transformer capacity at the Seattle end of the transmission line, according to the estimate.

Simultaneous construction of a dam at Diablo Canyon, at an estimated cost of \$1,250,000.

Continuing with his program for future development, Mr. Ross goes on to recommend a dewatering tunnel to the Diablo plant from Reflector Bar as the next step, with a power house capable of delivering 110,000 hp. at Diablo. Ruby dam would be started at the same time as the Diablo power house, and this step, complete, is expected to cost \$5,150,000. This plan would save the cost of building a railroad to Ruby, a difficult road to build, making it possible to transport materials for Ruby dam by water over the lake formed by Diablo dam. It also is claimed for this program that timber can be removed from the Ruby dam basin and marketed much more satisfactorily than by rushing the dam through as the first part of the expansion program.

Right-of-way for a transmission line from Bothell to South Station in Seattle also is included in the initial bond issue of \$2,500,000, and is estimated to cost \$211,000. The line would be built later. Wood tower line to the city is specified for this line, with steel-tower line within the city.

A similar report on Skagit development, laying down a program for twenty-five years of cumulative building activity to meet the demands estimated to result from Seattle's growth during that period, was filed with Mayor Brown by the Skagit engineering commission about the same time. On this commission were Maj. Joseph Jacobs, W. Chester Morse, and Stirling B. Hill, Seattle hydraulic engineers.

This report recommends: a Seattle-Tacoma tie line; the construction of a third Gorge unit; construction of Bothell switching station and steel tower line through the city; extension of the railroad from Gorge to Diablo; construction of Diablo power house, with first unit of 23,000-kw. capacity; construction of a second wood-structure line from Diablo to Bothell substation; construction of a second Diablo unit of 23,000 kw., and the following year, 1934, enlargement of Diablo power house and installation of a fourth unit of 23,000 kw.; construction of a concrete masonry dam at Ripraps or Ruby; a still further extension of the Diablo power house and installation of a fifth unit of 23,000 kw.; further extension of Bothell substation; construction of a

third transmission line from Diablo to Bothell; the enlargement of Gorge power house and installation of a fourth unit of 20,000 kw.; construction of the Ruby or Ripraps power house with first unit of 20,000 kw., designed to develop 28,000 kw. when higher head can be provided; extension of steel tower line to Ruby or Ripraps power house; and installation of subsequent second, third and fourth units at the Ruby or Ripraps power house, the elevation of the dam to gain higher head, and subsequent changing over of first two units of Ripraps or Ruby plant to accommodate the higher head. This program would extend to 1951. The total cost of the proposed development is estimated by the commission at \$28,550,000.

An estimate for extensions and improvements to the Seattle municipal distribution system for next year, amounting to \$4,000,000, also was filed by Mr. Ross. In it funds are asked for to extend street lighting, customers' service lines and underground distribution to enlarge substation equipment, raise the voltage capacity of the Tacoma tie line, install oil switches for city substations, and install motor-generator set for railway current at North Station.

Westinghouse Lamp Company Holds Coast Sales Meet

The plans of the Westinghouse Lamp Company for the next twelve months were outlined at the annual sales conference of the company's Pacific Coast district that was held in San Francisco Oct. 25-29, inclusive. All representatives in the district, which comprises eleven states and the territories of Hawaii and Alaska, were present at the meeting, which was presided over by Ray W. Murphy, Pacific Coast manager, and Paul R. Prietsch, chairman.

One of the outstanding features of the annual conference is that each member of the organization selects a subject which he presents in his own way to the assembled members, and at the recent meeting many interesting addresses were delivered.

A complete display of the company's advertising and publicity programs, including sales helps and similar matter, formed the background in the conference room and lent a colorful and cheerful aspect to the proceedings, as the entire display was illuminated. Several demonstrations of lighting and other features were incorporated in the program, which was voted highly successful and effective by the entire conference.

The recreational part of the program consisted of an informal reception on Sunday, Oct. 25, a theater party on Monday evening, Oct. 26, a golf tournament on the afternoon of Oct. 27, and a banquet in the evening of Oct. 28. The golf tournament was divided into a number of foursomes and produced some interesting results, as the players ranged from semi-professionals to novices who had never handled a club before.

Tea Garden and Rest Area at County Fair Make Good Will for Power Company

Among the service booths maintained this year at the San Joaquin Valley district fairs by the San Joaquin Light & Power Corporation with a view to keeping in the public mind the fact that the power company is primarily a corporation for public service was the tea garden with rest-room features at the Fresno District Fair, Sept. 28-Oct. 3.

On a lot 35 x 75 marked off by company poles mounted by the familiar "wishbone" crossarms characteristic of San Joaquin Power and secluded by a bark-covered fence, a frame reception room, a kitchen, rest rooms, and pergolas were built and covered with bark. Against the buildings cedar trees and ferns, brought from the company's mountain power houses, were banked, making a cool fragrant garden background for the tea table.

The main entrance led through the rustic reception room, the walls of which were covered with photographs of Junior stockholders and large tinted photographs of picturesque scenery in the vicinity of the company's power houses. Pamphlets containing stock sales information and post cards with views of company dams, power houses and other points of interest were on a table for all who were interested. In attendance was a company representative, sufficiently well versed to answer any questions, who personally extended the hospitality of the tea garden.

Beyond the reception room was the tea garden proper with tables half secluded by small carefully placed cedar trees. Two attractive pergolas sheltering benches added both to the garden effect and the seating accommodations.

In the kitchen at the rear of the garden one woman was sufficient to keep the tea hot and replenish the tea pots of the Chinese girls who served. Four Chinese girls were employed, working night and day shifts, with all four present during the rush hours in the late afternoon.

Cots in a room with drawn curtains offered a darkened rest room received in honest appreciation by mothers with tired children and women from out of town weary from a whole day of exhibit seeing.

A feature that held an especial attraction for children was a large cage at the back of the garden filled with doves, pheasants and rabbits.

The tea garden offered a quiet retreat from the jostling crowds, the cool green of a mountain garden making an effective contrast to the noise and dust of the fair. The spot was especially popular with women visitors who would stop a moment to rest and chat over their cup of tea. During the six days of the fair 5,750 people were guests in the power company's tea garden. The appreciative response to the company's service efforts was very noticeable. General comment on the service of the booth shows that returns in terms of good will were many times the investment.

The tea garden was a successful departure from the company's established custom of maintaining a nursery where mothers could leave their children, for a greater proportion of the public benefited by the tea garden and rest-room facilities than had previously been served by the nursery.

Public Relations New Department of Los Angeles Utility

The Los Angeles Gas and Electric Corporation has organized a new department to be known as the public relations department. D. L. Scott, who has been advertising agent for the company, has been appointed manager. A. G. Glass, superintendent of employees, E. P. Ramsey, advertising agent, and O. W. Twitchell, special agent, will report to the new manager of public relations.

In announcing the creation of the new department the management em-

phasized the fact that this is to be merely a new way to accomplish an old object, namely, the consolidation and co-ordination of the efforts of the entire organization so as to render a first-class service to the public in a way that will meet the public's approval.

Melones Power House Started by Pacific Gas and Electric

Ground has been broken and men and material are being assembled for the Pacific Gas and Electric Company's construction camp at the Melones power house site, located one mile downstream from the Melones dam which is now under course of construction 30 miles east of Oakdale, Calif.

The company will maintain a crew of about 125 men to build the power house and the concrete-lined tunnel, 4,500 ft. long, that will carry the water from the dam to the power house.

The construction of sidings and gradings is now under way. The company engineers have located the tramways which will lead from the camp sites to the power house. P. I. Kurtz, who was assistant superintendent of the Pacific Gas and Electric Company's Pit 3 power development in Shasta County will be in charge of the Melones construction.

Under the terms of an agreement between the Oakdale and South San Joaquin Irrigation District and the Pacific Gas and Electric Company (Journal of Electricity, Sept. 15, 1925, p. 226) the irrigation districts will build a dam 200 ft. high and 590 ft. long at a cost of \$2,200,000 to impound 112,000 acre-ft. of water. The power company will build the tunnel and the 36,000-hp. plant consisting of two generator units, one mile downstream from the dam, at a cost of \$2,500,000. The power house alone will cost \$1,900,000.

The stored water will pass through the power house, and the irrigation district will receive \$1.25 an acre-ft. for this water from the power company, which will be at a rate sufficient to pay the interest on the bonds and pay off the bonds which the people have voted, by the end of forty years.

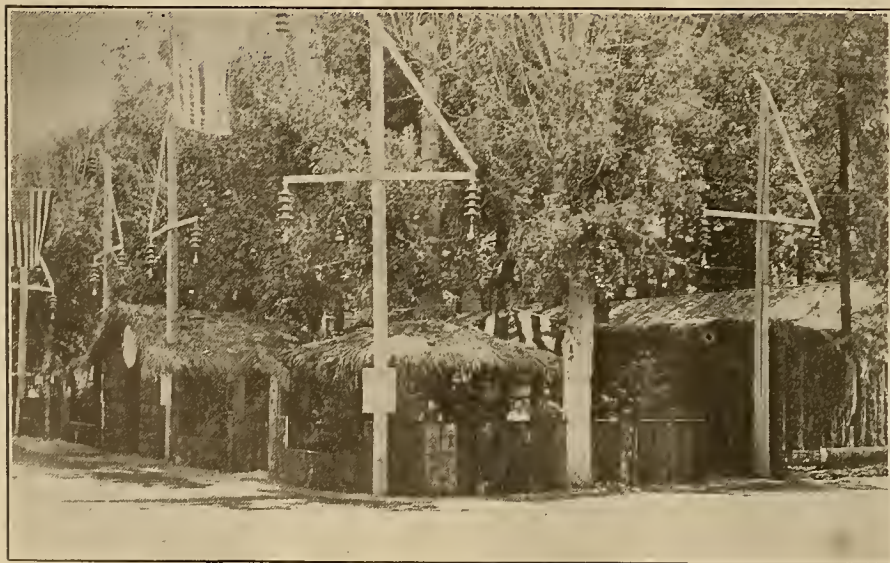
Plans call for the completion of the storage reservoir in time to catch the 1926 run-off which will be used for irrigation after passing through the power house.

Southern Sierras Power Company Applies for Revaluation

The Southern Sierras Power Company, Riverside, Calif., has applied to the California Railroad Commission for a revaluation of its plants and properties for the purpose of fixing new rates for that utility.

The company, which operates in Mono, Inyo, Kern, San Bernardino, Riverside, Imperial and San Diego Counties, in California, alleges that the present rates fixed by the Railroad Commission are unreasonable and confiscatory and do not yield a sufficient return upon the value of the property.

The rate schedules of the Holton Power Company, owned by the Southern Sierras company, are to be included in the fixing of any new rates for the latter company.



Apart from the "maddening crowd," a restful, cool retreat, with an atmosphere of the mountains brought from the company's power houses, the tea garden and rest rooms provided by the San Joaquin Light & Power Corporation at the Fresno County Fair proved so keenly appreciated an accommodation to the women visitors and their children that the company was commended highly for its thoughtfulness and spirit of service.

Colorado River League Former by Upper Basin States

Formed for the purpose of obtaining ratification of the Colorado River compact by all the states, or a similar interstate agreement on the allocation of the waters of the Colorado River among the seven states concerned, the Colorado River League has been incorporated under the laws of Colorado and formally organized. Its membership includes mayors of municipalities, chambers of commerce, civic organizations and state officials of the upper basin states, New Mexico, Colorado, Utah and Wyoming. Officers of the league are: president—L. Ward Bannister, Denver; vice-president for Colorado—L. C. Paddock, Boulder; vice-president for Wyoming—Archie Allison, Cheyenne; vice-president for Utah—A. F. Bigelow, Ogden; secretary-treasurer—Dr. Fuller Swift, Denver. The vice-president for New Mexico has not yet been named. In addition to the officials there is a board of directors of twenty-five members.

In a formal statement issued recently by the board of directors of the league on the Colorado River controversy it was announced that the league now represents between 5,000 and 10,000 persons in the four states of the upper basin. The statement pointed out that there are but two ways to arrive at a solution of the problem of a fair division of the waters of the Colorado River, one by interstate agreement and the other by litigation. Litigation is opposed by the league. Attention was directed by the statement to the Colorado River compact, which provides that out of the average flow of the river amounting to 20,000,000 acre-ft. annually 8,500,000 acre-ft. shall go to the states of the lower basin and 7,500,000 acre-ft. to the upper basin states, the remainder to be allocated in the future. The compact has been ratified by all the states except Arizona and California.

The league sent a special delegation to the hearing before the Federal Power Commission in Washington to oppose the application of J. B. Girard for permit to construct a power plant at Diamond Creek in Arizona.

Denied City Power by Utility Commission in Utah Town

Nineteen persons in the city of Parowan, Utah, lately were denied a permit by the Public Utilities Commission of Utah for authority to take electric energy from the Parowan city electric plant instead of from the plant of the Dixie Power Company, which now is serving the section in which the petitioners reside. The commission also ratified the contract existing between the city of Parowan and the Dixie company whereby the latter will take 200 hp. minimum from the Parowan city plant, so long as the Parowan plant can supply it, at \$1.25 per horsepower per month.

The commission states that it is compelled to take into consideration "the effect that granting this petition would have upon the users of power and light in the balance of the territory occupied by the Dixie Power Company. The loss of income now derived by the power company in the vicinity of Parowan, together with the capital loss entailed by the enforced

removal of the existing transmission lines, would ultimately have been borne by the users in St. George, Cedar City, Hurricane, Washington, Summit and various other communities and industries now served by it."

The power company will take the service from the city just outside the city power plant, will transform it from 2,300 to 33,000 volts, and will furnish the city also with emergency or breakdown service at the same rates that the city is charging for power, except that there is to be no minimum. Under the terms of the agreement approved, the municipal plant virtually becomes a part of the power company's system as to all power except that required by Parowan and Paragoonah, which are the first concern of the municipal plant.

Confident Six-State Pact Will Bring Colorado Peace

George M. Bacon, state engineer of Utah, as the principal speaker at a recent meeting of the Engineering Council of Utah at Salt Lake City addressed the Council on the subject of the present status of the Colorado River situation. Mr. Bacon, who attended the Senate Reclamation Committee hearings at Los Angeles relative to the six-state pact, stated that in his opinion the pact is going ahead, although there is not much showing on the surface.

He praised the Utah officials and others who are taking an active part in the Colorado River controversy for laying politics aside in the matter and making the welfare of the state paramount. In Arizona, he declared, the issue is being made a political one, with discord and lack of agreement resulting. Mr. Bacon said that the ratification of the six-state pact could be brought about eventually with the cooperation of the states involved.

Northwest Active in Industrial Lighting Campaign

Direct solicitation, rather than a general advertising campaign, is being employed to develop industrial lighting in the Northwest geographic division of the Industrial Lighting Activity, according to word from Henry J. Gille, general sales manager of the Puget Sound Power & Light Company, Seattle, one of the geographic chairmen for the Northwest division.

Because the industries of the Northwest were felt to be more effectively reached by direct personal representation rather than general advertising, attention has been brought to a focus on this type of activity. Sales literature, however, has been distributed, and the campaign already is under headway. While spectacular results are not contemplated, according to Mr. Gille, the field is to be covered thoroughly and lighting in the industries of the Northwest is expected to be improved in many notable instances.

Ensenada, Mexico, Builds Electric Power Plant.—As a vital part of the new civic development program of Ensenada, Baja California, Mexico, construction work on a modern electric power plant is now under way. The initial capacity of the plant will be 200 kw., and it is expected to be completed and put in operation by Dec. 1.

Longest Span Is Strung Across Tacoma Narrows

Claimed to be the longest span in the world, the 110-kv. line from the city of Tacoma's Cushman plant, crossing Puget Sound at The Narrows between Point Evans and Tacoma, recently was strung. The span is 6,240 ft. long, 1,100 ft. longer than that across the Little Tennessee River, said to have been the longest previously strung. The line is strung from steel towers, a donkey engine being used to pull up the cable from the bottom of The Narrows where it previously was laid preliminary to pulling up.

Six cables of special plough steel are being used to span The Narrows on the Cushman line to Tacoma. The cable for each span is calculated to pension, according to press reports, weigh 11 tons, a 24-ton pull being necessary to bring it to required suspension. The lines are to be kept at a minimum of 220 ft. above the water level.

Impounding of water behind the Lake Cushman dam began during the latter part of October. The gates of the diversion tunnel were closed with impressive ceremony by city officials and the contractors. Work on the power-house installation, however, has been delayed due to failure of one of the turbine spiral casings under test, with the loss of one life, and will not be completed in the expected time, it was announced.

Power Commission Extends Three Preliminary Permits

The Federal Power Commission has extended until Aug. 20, 1926, the preliminary permit granted the Yosemite Power Company of San Francisco for a development on the Toulumne River and its Middle and South Forks. The extension of the permit was requested by the company so as to grant additional time to arrange for the sale of the power.

The permit of the Home Power Company, of Skagway, Alaska, has been extended until July 17, 1926. The company found it impossible to complete its investigational work during the two years it has had the permit.

The permit of John L. Fish, of Lakeside, Ariz., covering a project on Salt River has been extended until March 6, 1927. The additional time is necessary to complete the investigation of a more comprehensive scheme of development than was contemplated originally.

Bedrock Found for Power Dam on Clearwater River

Working under the direction of J. Lorenz, engineer, Inland Light & Power Company, engineers have located a site on the Clearwater River, a short distance east of Lewiston, Idaho, upon which drillings indicate bedrock at a depth of not to exceed 12 ft. The site is being sought as a location for a dam to be used in connection with a power project.

The site was located about a mile below one favored by J. A. Stevens, engineer of Portland, Ore., when employed by the city at the time it contemplated erecting a dam. The site will necessitate about 4,000 ft. of diking on the river side of a large logging storage.

Mountain States Organize for Industrial Lighting

Under the geographic chairmanship of C. E. Addie, Public Service Company of Colorado, Denver, the organization of the Rocky Mountain Division of the Industrial Lighting Committee, N.E.L.A., has been completed and work has started in the actual campaign activity. Broad-sides prepared by the national committee to the number of 4,500 have been distributed, and sales effort to follow these up has begun.

In announcing his organization, Mr. Addie declared that since his preliminary set-up has been completed, the campaign is now under way. Mr. Addie has appointed to handle the publicity of the campaign F. R. Jamison, of the Public Service Company of Colorado, and E. K. Hartzell, of the same company.

The detailed organization is as follows: Public Service Company of Colorado for the cities of Boulder, Lafayette, Windsor, Loveland, and Ft. Collins, Colo., Ed. Rowland, vice-chairman; Cheyenne Light, Fuel & Power Company, Cheyenne, Wyo., C. J. Hughes, vice-chairman; Arapahoe Electric Light & Power Company, Littleton, Colo., W. C. Sterne, vice-chairman; Western Public Service Company, Larame, Wyo., M. H. Soule, vice-chairman; Public Service Company of Colorado, Sterling, Colo., Howard Newman, vice-chairman; Albuquerque Electric Light & Power Company, Albuquerque, N. M., Arthur Prager, vice-chairman; Public Service Company of Colorado, Leadville, Colo., William Wren-ton, vice-chairman; Suburban Light & Power Company, Aurora, Colo., F. A. Einfeldt, vice-chairman; Public Service Company of Colorado, Salida, Colo., W. S. Bates, vice-chairman; Arvada Electric Light Company, Arvada, Colo., C. M. Dunken, vice-chairman; Roswell Public Service Company, Roswell, N. M., F. A. Herring, vice-chairman; Public Service Company of Colorado, Idaho Springs, Colo., George Pascoe, vice-chairman; Natrona Power Company, Casper, Wyo., R. C. Gunnell, vice-chairman; Southern Colorado Power Company, Pueblo, Colo., E. F. Stone, vice-chairman; Jefferson County Light & Power Company, Golden, Colo., E. A. Phinney, vice-chairman; and Public Service Company of Colorado, Alamosa, Monte Vista, Del Norte, Center, and Southern extension, including six towns in Colorado, George Hay, vice-chairman.

A. I. E. E. News

San Francisco Section will hold its next meeting in the new home of the Pacific Telephone & Telegraph Company at 140 New Montgomery Street, as the guests of the telephone company. The speaker of the evening will be C. W. Burkett, consulting engineer for the telephone company, who will discuss the many interesting electrical and structural features of the new building. The meeting will be held Friday, Dec. 11.

Pacific Coast Electrical Association

Commercial Section Outlines Year's Sales Studies at Conclave Meeting

From the announcement of the goals set by the individual committees of the Commercial Section for the year, made at the general meeting of the entire section following individual committee meetings, Nov. 19, that section has set itself to tasks which should mark this year as one of the outstanding years of Commercial Section activity. With each committee pledging itself to definite sales work, the functions of the section are to be pointed toward greater commercial expansion of all electrical industries in the territory of the Pacific Coast Electrical Association.

Opening the general meeting of all section representatives at the conclave, H. M. Crawford, Pacific Gas and Electric Company, San Francisco, Commercial Section chairman, asked first for an outline of each committee's plan of action. He then dismissed the general meeting that the delegates might go into individual committee meetings. After several hours of committee work each of the committee chairmen then was to report to a second general section meeting the definite plan of the work to be undertaken by his committee.

At this second meeting H. K. Griffin, Western States Gas & Electric Company, Stockton, vice-chairman of the section, who was given charge of the meeting, called upon each of the committee chairmen for reports of their respective committee programs for the year.

H. H. Singletary, Pacific Gas and Electric Company, San Francisco, chairman of the electric truck committee, first was called upon for a report. He announced that his committee had decided upon a representative for each district of the Association territory to be responsible for the procuring of a prospect list for electric truck sales, since the committee was pledged to a definite sales program for the year. Sales effort, it was pointed out, last year was devoted to the member companies themselves with the hope of getting each company to use electric trucks itself. This year electric trucking is to be sold to industrial and commercial enterprises from such prospect lists by means of promotional sales letters to prospects. A series of six letters is to be sent out, the first one as a registered letter, Mr. Singletary said, starting Jan. 15. A follow-up letter is to be mailed every two weeks. A reel of motion pictures is to be prepared, in co-operation with electric truck manufacturers, to set forth the advantages of electric trucking. The film is to be used in sales promotion work. The committee also is to ask the Transportation Section of the Pacific Coast Electrical Association for a representation on its com-

mittee so that the electric truck will be given consideration in whatever transportation programs are laid out by the operating departments of member utility companies.

Lloyd Henley, San Joaquin Light & Power Company, Fresno, chairman of the customer service committee, next reported on the plans of his committee. Mr. Henley said that his committee work would look back into the past year's committee's work in fostering the more widespread use of the excellent employees' manual prepared by its predecessor committee. An essay contest for employees of member companies, the subject being the actual value of the manual as found by personal experience with it in contact with the public, is to be started. Instructions for executives in backing up the use of the manual are to be prepared by this committee this year also.

F. E. Boyd, General Electric Company, San Francisco, chairman of the power committee, reported that the attention of his committee would be concentrated upon sales of electrical industrial heating installations this year. Two subcommittees are to be appointed, one for the southern part of the state, another for the north, each to interview executives of power companies to impress upon them the value of industrial heating sales effort, and to recommend that men be sent to the National Electric Light Association industrial heating school. As a second major activity, the committee plans to follow up last year's work in the preparation of a limited edition (for power salesmen) of a compilation of Pacific Coast industrial heating applications. Power salesmen also are to be urged to call upon the manufacturers for available lectures and slides on industrial heating applications.

J. W. Wrenn, Great Western Power Company, San Francisco, chairman of the merchandising committee, although his committee had not yet reached definite program conclusions, made a preliminary report. It later developed in meetings of his committee that the more important phases of merchandising would be studied from their sales angles. A special study of electric refrigeration was promised. Another paper on the electric washing-machine situation also is to be considered and presented. But probably the most important step contemplated by the committee is the formation of a month-to-month concentrated sales plan for the selling of small appliances, seeking the unified action of dealers, contractors, jobbers, non-electrical outlets, and power companies. Advertising and special sales, featuring one appliance at a time with every outlet selling or featuring the same appliance at the same time, are to be organized and

fostered. Consideration of the problems relative to servicing appliances also will be given study.

Like the merchandising committee, the cooking and heating committee in a preliminary report was said to be engaged upon a sales study by its chairman, P. P. Pine, San Diego Consolidated Gas & Electric Company. After the Nov. 20 meetings of the committee, however, it was disclosed that the chief activity for the year would be the compilation of a pocket manual for salesmen on each of the phases of work undertaken by the committee. The subcommittees on domestic cooking, commercial cooking, air heating, and water heating, are each to prepare such a manual, all of them to be combined for the ready use of salesmen. The committee as a whole expressed a desire to prepare a spectacular presentation of cooking and heating to be given before the convention next June.

Clark Baker, National Lamp Works of General Electric Company, chairman of the lighting committee, submitted a plan for a far-reaching educational program on lighting. The study of lighting of farms is to be continued by a special subcommittee. Street-lighting practice data are to be brought up to date by another committee. But the most outstanding work which the committee sets itself to do is the preparation of a condensed educational talk, to be given with spectacular effects from a special light box at fifty-eight of the leading business men's organizations of the state. A speakers' bureau is to be organized for this purpose, and to keep commercialism from the presentation the entire subject is to be handled as "what has been accomplished in the use of light," rather than "what we are going to do," according to Mr. Baker.

Announcement was made that another general conclave of the Commercial Section would be held in Los Angeles in February, the date and place to be announced later.

Executive Committee Sets 1926 Convention Dates and Place

A meeting of the executive committee of the Pacific Coast Electrical Association was held in the offices of the secretary in San Francisco on Nov. 20, William Baurhtye, president, in the chair.

The budget requirements of section chairmen were presented and approved after presentation and approval of the treasurer's report.

W. L. Frost, Southern California Edison Company, and F. H. Woodward, Great Western Power Company, were reappointed to the advisory committee of the California Electrical Bureau, succeeding themselves.

It was suggested and approved that it would be to the interests of the Association, with particular respect to publication of convention papers, to have a competent editing committee as such a committee would save the Association considerable money in the cost of printing.

The president announced the appointment of E. R. Northmore as chairman of the general convention committee, and stated that preliminary negotiations were under way with the Biltmore and Ambassador Hotels in Los Angeles with reference to headquarters for the 1926 convention. The

committee unanimously approved the selection of Los Angeles for its convention, and the dates were fixed as June 8-11, 1926.

C. T. Hutchinson presented before the executive committee a discussion of the plan of the California Electrical Bureau with special reference to its new organization and the administration of the Red Seal campaign for adequate house-wiring in 1926. Following this a resolution was presented and passed expressing the approval of the executive committee of the plan and work undertaken by the Bureau.

Advertising Section Has Meeting in San Francisco

In common with many other sections, committees and organizations, the Advertising Section, Pacific Coast Electrical Association, held a meeting in San Francisco, Nov. 19. The meeting was held in the Palace Hotel, with a large attendance of utility advertising men. D. L. Scott, Los Angeles Gas and Electric Corporation, chairman, presided.

Reports from the committee chairmen on Standards, Technique, and Better Business Methods were heard, and a further organization of these committees was perfected. A luncheon at noon brought together the delegates in a social period of relaxation between the two sessions held during the morning and afternoon.

P.C.E.A. Committee Personnel for 1925-26 Announced

The chairmen of the various sections, bureaus, committees and subcommittees of the Pacific Coast Electrical Association have been busy making appointments and otherwise perfecting their working organizations. These preliminaries have been practically completed, and below is given a list of the officers of the association and, as of Dec. 1, the committee personnel for 1925-26.

ACCOUNTING SECTION

B. B. Smith, Western States G. & E. Co.—chairman.
A. B. Carpenter, S. J. L. & P. Corp.—vice-chairman.

CLASSIFICATION OF ACCOUNTS COMMITTEE

C. P. Staal, So. Cal. Ed. Co.—chairman.
E. W. Hodges, P. G. and E. Co.

EDITING COMMITTEE

A. B. Carpenter, S. J. L. & P. Corp.—chairman.
E. W. Hodges, P. G. and E. Co.

FIXED CAPITAL COMMITTEE

P. R. Ferguson, So. Sierras Pwr. Co.—chairman.
J. M. Bourus, S. D. Cons. G. & E. Co.

REVENUE AND DISBURSEMENTS COMMITTEE

J. A. Cannon, S. D. Cons. G. & E. Co.—chairman.
H. S. Barber, So. Sierras Pwr. Co.

STATISTICAL METHODS COMMITTEE

R. E. Farrand, Coast Counties G. & E. Co.—chairman.
E. N. Hoffman, Coast Valleys G. & E. Co.

General Committee

M. F. Wales, Coast Counties G. & E. Co.—chairman.
O. L. Moore, L. A. G. & E. Corp.
E. N. Hoffman, Coast Valleys G. & E. Co.

ADVERTISING SECTION

D. L. Scott, So. Cal. Ed. Co.—chairman.

BETTER BUSINESS COMMITTEE

M. W. Scanlon, Westinghouse E. & M. Co.—chairman.

B. S. Allen, Key System Transit Co.
J. U. Berry, Valley Elect. Supply Co.
H. M. Crawford, P. G. and E. Co.
W. A. Cyr, Journal of Electricity.
J. C. Douglas, Edison Elec. Appl. Co.
R. B. Finley, G. E. Co.
S. W. Green, S. J. L. & P. Corp.
H. K. Griffin, Western States G. & E. Co.
J. C. Hobrecht, J. C. Hobrecht Co.
J. J. Hutchins, Valley Elect. Supply Co.
J. C. Jordan, P. G. and E. Co.
A. C. Joy, S. J. L. & P. Corp.
C. B. Kenney, NePage McKenny Co.
F. S. Myrtle, P. G. and E. Co.
A. H. Nicoll, Western Elect. Co.
J. W. Otterson, Journal of Electricity.
C. H. Pierson, So. Cal. Ed. Co.
J. F. Pollard, Coast Valleys G. & E. Co.
Paul Prietsch, Westinghouse Lamp Co.
F. B. Rae, Pacific States Elect. Co.
Arthur Rowe, Garnett Young Co.
F. N. Smith, Los Angeles.
F. Z. Stone, So. Sierras Pwr. Co.
F. H. Woodward, Grt. Western Pwr. Co.

Merchandising Campaigns Subcommittee

J. U. Berry, Valley Elect. Supply Co.
H. M. Crawford, P. G. and E. Co.
J. C. Douglas, Edison Elec. Appl. Co.
J. C. Hobrecht, J. C. Hobrecht Co.
J. J. Hutchins, Valley Elect. Supply Co.
J. C. Jordan, P. G. and E. Co.
A. H. Nicoll, Western Elect. Co.
Paul Prietsch, Westinghouse Lamp Co.
F. B. Rae, Pacific States Elect. Co.
F. N. Smith, Los Angeles.
F. H. Woodward, Grt. Western Pwr. Co.

Co-operative Publicity Subcommittee

R. B. Finley, G. E. Co.
S. W. Green, S. J. L. & P. Corp.
H. K. Griffin, Western States G. & E. Co.
F. S. Myrtle, P. G. and E. Co.
J. W. Otterson, Journal of Electricity.
C. H. Pierson, So. Cal. Ed. Co.
J. F. Pollard, Coast Valleys G. & E. Co.
F. Z. Stone, So. Sierras Pwr. Co.

Advertising Activities of Associations Subcommittee

V. H. Hartley, Cal. Elect. Bureau.
C. B. Kenney, NePage McKenny Co.
Arthur Rowe, Garnett Young Co.

CONVENTION EXHIBIT COMMITTEE

E. P. Ramsay, L. A. G. & E. Corp.—chairman.

INFORMATION COMMITTEE

F. S. Myrtle, P. G. and E. Co.—chairman.

STANDARDS COMMITTEE

B. S. Allen, Key System Transit Co.—chairman.
W. A. Cyr, Journal of Electricity.
A. C. Joy, S. J. L. & P. Corp.

TECHNIQUE COMMITTEE

J. Charles Jordan, P. G. and E. Co.—chairman.

General Committee

C. L. Burgess, Westinghouse E. & M. Co.
A. G. Jones, G. E. Co.
E. P. Ramsay, L. A. G. & E. Corp.
R. E. Smith, So. Cal. Ed. Co.
G. C. Tenney, Journal of Electricity.

COMMERCIAL SECTION

EXECUTIVE COMMITTEE

H. M. Crawford, P. G. and E. Co.—chairman.
H. K. Griffin, Western States G. & E. Co.—vice-chairman.

F. A. Marshall, P. G. and E. Co.—secretary.
R. A. Balzari, Westinghouse E. & M. Co.
G. T. Bigelow, So. Sierras Pwr. Co.
P. H. Booth, Edison Elect. Appl. Co.
F. E. Boyd, G. E. Co.
G. H. P. Dellmann, S. D. Cons. G. & E. Co.
A. M. Frost, S. J. L. & P. Corp.
A. H. Nicoll, Western Electric Co.
D. C. Ray, P. G. and E. Co.
H. C. Rice, So. Cal. Ed. Co.
R. A. Sharon, Grt. Western Pwr. Co.
H. H. Walker, H. H. Walker Co.
Frank Weiss, L. A. G. & E. Corp.

APPLIANCE COMMITTEE

J. W. Wrenn, Grt. Western Pwr. Co.—chairman.
G. W. Barker, Allied Industries—vice-chairman.
E. S. Alexander, Alexander & Lavenson Elect. Sup. Co.
H. H. Courtwright, Valley Elect. Supply Co.
R. G. Holabird, Western Electric Co.
J. C. Hobrecht, J. C. Hobrecht Co.
Arthur Kempston, Majestic Elect. Appl. Co.
Frank Pollard, Heesman Pollard Co.
R. T. Stephens, P. G. and E. Co.
G. B. Schuyler, Johnson Elect. Washer Co.
R. E. Tompkins, Pacific States Elect. Co.
C. J. E. Watson, Landers, Frary & Clark.

CUSTOMER RELATIONS COMMITTEE

Lloyd Henley, S. J. L. & P. Corp.—chairman.

ELECTRIC COOKING AND HEATING COMMITTEE

P. P. Pine, S. D. Cons. G. & E. Co.—chairman.
E. F. Perkins, P. G. and E. Co.—vice-chairman.
George Cole, Edison Elect. Appl. Co.—secretary.

Air Heating Subcommittee

C. B. Merrick, Sandoval Sales Co.—chairman.
G. T. Bigelow, So. Sierras Pwr. Co.
Frank Cronan, Western States G. & E. Co.
O. R. Doerr, Grt. Western Pwr. Co.
Arthur Kempston, Majestic Elect. Appl. Co.
E. A. Wilcox, Manufacturers' Agent.
J. W. Wrenn, Grt. Western Pwr. Co.

General Cooking Subcommittee

E. F. Perkins, P. G. and E. Co.—chairman.

Commercial Cooking Subcommittee

W. R. Adams, P. G. and E. Co.—chairman.
R. C. Bragg, Vallejo Light & Pwr. Co.
Wm. Krueger, Pacific States Elect. Co.
T. A. Reid, Westinghouse E. & M. Co.
A. J. Thornley, So. Cal. Ed. Co.

Domestic Cooking Subcommittee

Morris Foster, Coast Counties G. & E. Co.—chairman.
P. H. Booth, Edison Elect. Appl. Co.
H. A. Cram, Landers, Frary & Clark.
A. M. Frost, S. J. L. & P. Corp.
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 F. T. Ellis, P. G. and E. Co.
 E. A. Quinn, S. J. L. & P. Corp.

E. D. Sherwin, S. D. Cons. G. & E. Corp.
 W. H. Short, So. Cal. Ed. Co.
 C. H. Zeise, L. A. G. & E. Corp.

Cooling Towers and Spray Ponds Subcommittee

Weller Reed, L. A. G. & E. Corp.—chairman.
 V. E. Johnson, So. Sierras Pwr. Co.
 R. F. Leafeld, L. A. G. & E. Corp.
 E. G. MacDonald, L. A. G. & E. Corp.
 A. Y. Mendell, S. J. L. & P. Corp.
 G. W. Thunen, S. J. L. & P. Corp.

Condensers Subcommittee

C. W. Wiggins—chairman.
 P. M. Robinson, Hunt, Mirk Co.
 J. G. Rollow, L. A. G. & E. Corp.
 J. H. Stott, P. G. and E. Co.
 W. E. Thompson, So. Cal. Ed. Co.

Heat Balance Subcommittee

F. G. Philo, So. Cal. Ed. Co.—chairman.
 J. M. Brennan, P. G. and E. Co.
 R. F. Monges, G. E. Co.
 R. C. Powell, P. G. and E. Co.
 Weller Reed, L. A. G. & E. Corp.
 W. E. Thompson, So. Cal. Ed. Co.

Standby Plant Design Subcommittee

C. E. Steinbeck, P. G. and E. Co.—chairman.
 H. L. Doolittle, So. Cal. Ed. Co.
 R. A. Hopkins, Westinghouse E. & M. Co.
 H. S. Markey, Grt. Western Pwr. Co.
 C. P. Rhine, S. J. L. & P. Corp.
 E. E. Valk, G. E. Co.

Station Auxiliaries Subcommittee

L. J. Krap, So. Cal. Ed. Co.—chairman.
 L. D. Burlingame, P. G. and E. Co.
 C. P. Couttrap, So. Cal. Ed. Co.
 F. R. Knight, L. A. G. & E. Corp.
 E. E. Mulkey, P. G. and E. Co.
 Harvey Searight, Allis-Chalmers Co.

SAFETY RULES COMMITTEE

W. R. Frampton, So. Cal. Ed. Co.—chairman.

E. J. Crawford, S. J. L. & P. Corp.—vice-chairman.
 R. A. Balzari, Westinghouse E. & M. Co.

J. E. Brown, Westinghouse E. & M. Co.
 H. H. Buell, P. G. and E. Co.

E. N. D'Oyly, Western States Gas & E. Co.
 C. F. Gilcrest, S. J. L. & P. Corp.

J. A. Koontz, Grt. Western Pwr. Co.
 H. S. Lane, P. G. and E. Co.

S. J. Lisberger, P. G. and E. Co.
 H. H. Miller, So. Sierras Pwr. Co.

H. C. Moyer, P. G. and E. Co.
 E. R. Northmore, L. A. G. & E. Corp.

S. P. Russell, H. B. Squires Co.
 G. H. Searle, P. G. and E. Co.

F. A. Short, Safety Elect. Prod. Corp.
 D. D. Smalley, Midland Counties P. S. Corp.

C. E. Spaulding, G. E. Co.

Grounding of Primary and Secondary Lines Joint Subcommittee

R. H. Cates, So. Cal. Ed. Co.
 W. H. Talbott, S. D. Cons. G. & E. Co.

Meter-Test Facilities Subcommittee

J. M. Buswell, S. J. L. & P. Corp.—chairman.
 G. H. Searle, P. G. and E. Co.

N. B. Hinson, So. Cal. Ed. Co.

UNDERGROUND SYSTEMS COMMITTEE

P. E. Chapman, P. G. and E. Co.—chairman.

N. B. Hinson, So. Cal. Ed. Co.—vice-chairman.

K. E. Ayres, S. D. Cons. G. & E. Co.
 M. O. Bolser, L. A. Bureau P. & Lt.

H. H. Buell, P. G. and E. Co.
 R. F. Conlisk, Westinghouse E. & M. Co.

G. H. Hagar, Grt. Western Pwr. Co.
 G. L. Hill, P. G. and E. Co.

C. H. Jenkins, L. A. Bureau Pwr. & Lt.
 H. G. Keesling, P. G. and E. Co.

D. J. Kelly, S. D. Cons. G. & E. Co.
 T. J. Lovell, So. Cal. Ed. Co.

R. P. Lutz, P. G. and E. Co.
 O. C. Miller, L. A. G. & Elec. Corp.

H. H. Minor, S. J. L. & P. Corp.
 J. M. Morris, Westinghouse E. & M. Co.

H. C. Moyer, P. G. and E. Co.
 E. R. Northmore, L. A. G. & E. Corp.

G. A. Peers, Coast Valleys G. & E. Co.
 A. C. Putnam, So. Sierras Pwr. Co.

M. H. Schnapp, G. E. Co.
 Vinton Smith, Stand. Underground Cable Co.

Paul Suransky, P. G. and E. Co.

TRANSPORTATION SECTION

S. B. Shaw, P. G. and E. Co.—chairman.

P. H. Ducker, So. Cal. Ed. Co.—vice-chairman.
 D. C. Bertrand, Grt. Western Pwr. Co.—secretary.

W. E. Gallimore, Electric Storage Battery Co.
 C. H. Gray, So. Sierras Pwr. Co.

D. P. Mason (member ex-officio), S. J. L. & P. Corp.

Russell Mills, P. G. and E. Co.



News of the Electragists



Electragists to Hold Quarterly Meeting in Sacramento

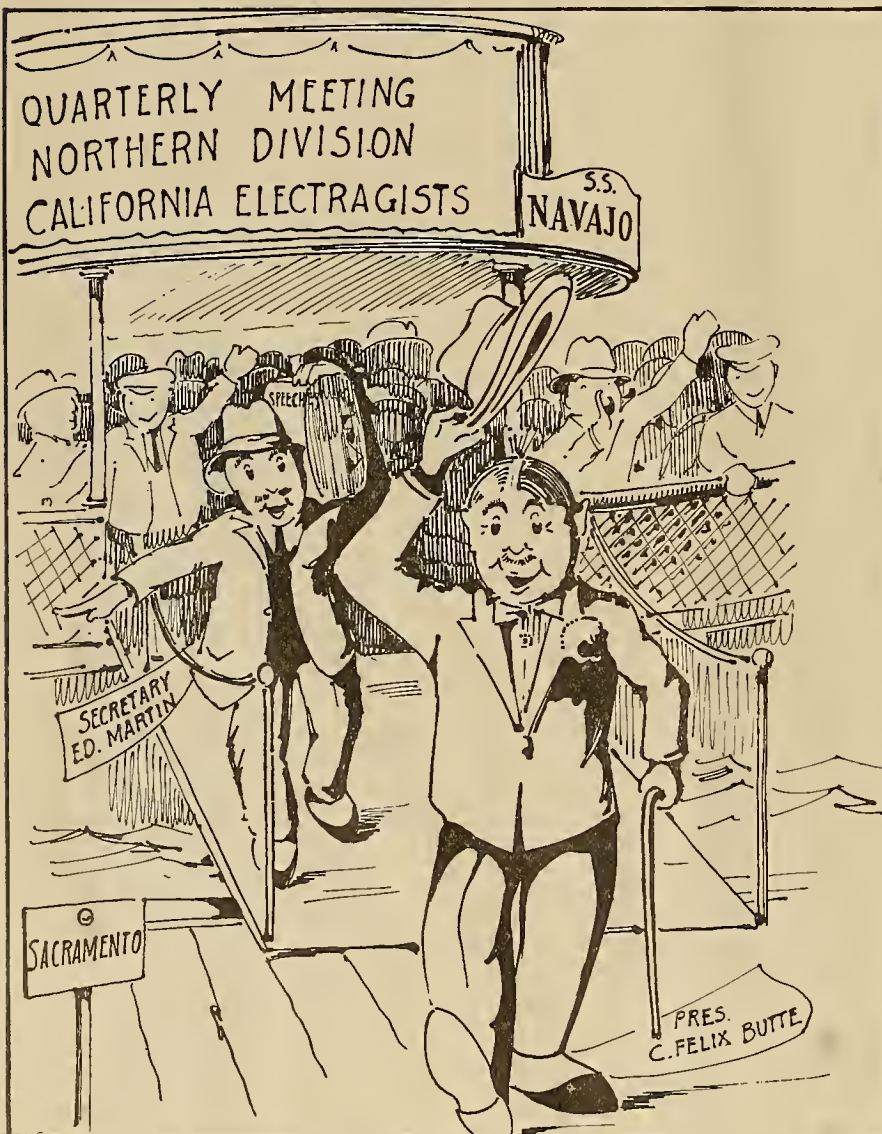
The California Electragists, Northern Division, will hold its quarterly meeting at the Hotel Senator, Sacramento, on Saturday, Dec. 5. The steamer Navajo has been chartered for the occasion to carry the electragists from the San Francisco Bay territory to the capitol city. It will leave San Francisco from pier 5 Friday, Dec. 4, at 5:30 p.m., arriving in Sacramento Saturday morning.

The executive committee will hold its meeting Saturday at 9 a.m. This will be followed by a closed meeting of members at 10 a.m. The general open meeting will be held in the afternoon at 2:00. An extensive program has been prepared, and a large number is planning to attend the meetings.

The return trip will be made Saturday night, leaving Sacramento at 5:30 p.m. and arriving in San Francisco Sunday morning.



J. I. Dixon, city electrician of Santa Clara (left), and Claude W. Mitchell, of the Board of Fire Underwriters of the Pacific, "snapped" at the semi-annual meeting of the California Association of Electrical Inspectors that was held in Fresno, Sept. 24-26. Mr. Mitchell has been especially active in promoting the work of the Association, of which he is secretary. He also has been assisting in the formation of a similar association in the Northwest.



"Well, well, Sacramento, here we are!"

Book Reviews

ELECTRICAL PRECIPITATION

By SIR OLIVER LODGE, D.Sc., F.R.S.
40 pages; \$1. Published by the Oxford University Press, American Branch, New York City.

The first chapter, "Natural Precipitation," is an extended discussion and affirmation of the theory of Dr. George C. Simpson promulgated in 1909 and tending to show that the mere breaking of a falling drop of water into smaller drops results in an electric charge. This theory is extended to suggest a very plausible explanation of the heavy electric discharges occurring during a thunderstorm.

The second chapter, "Artificial Precipitation," deals with the classical work of Lodge and Cottrell on dust precipitation and its many practical applications in industry.

The concluding chapter opens an interesting field of speculation as to the possibilities of using artificial electrical charges to assist natural atmospheric precipitation.

L.F.L.

PROSPERITY THROUGH POWER DEVELOPMENT

By JULIUS H. BARNES, ARTHUR HADLEY, HERBERT C. HOOVER, SAMUEL INSULL, CARL D. JACKSON, DUGALD C. JACKSON, W. S. LEE, JOHN W. LIEB, FRED R. LOW, A. H. MARKWART, W. S. MURRAY, J. P. NOONAN and GUY E. TRIPP; 59 pages. Abstracted and published by the National Electric Light Association, New York City.

This condensed volume consists of abstracts from addresses presented at the first World Power Conference held at London in July, 1924, by the authors named.

The papers deal with questions of efficient power development as a necessity to the social and economic betterment of the race; and with the practical problems of interconnected power systems; private versus public ownership, and the regulatory work of state commissions.

The symposium is characterized by the strictly logical methods of analysis adopted by the authors, and is agreeably free from emotional and loose generalities.

L.F.L.

Bureau of Mines Issues Paper on Permissible Explosives.—A total of 153 permissible explosives, a number of "explosion-proof" coal-cutting machines, permissible electric lamps, permissible flame safety lamps, methane indicators and detectors, electric flash lamps, electric drills, shot-firing units, and storage battery locomotives, and different types of gas masks and mine-rescue breathing apparatus are approved by the Bureau of Mines, Department of Commerce, in Technical Paper 376. Copies of the paper, "Permissible explosives, mining equipment, and rescue apparatus approved prior to Jan. 1, 1925," by J. E. Crawshaw, L. C. Ilsley, D. J. Parker and A. C. Fieldner, may be obtained from the Bureau of Mines, Department of Commerce, Washington, D. C.

Meetings

Red Seal Plan Outlined Before Electrical Bureau

A meeting of the advisory committee of the California Electrical Bureau was held in San Francisco Nov. 23.

After the routine business the main topic of discussion was the consummation of final plans toward the promotion of the Red Seal plan of adequate house-wiring which will constitute the principal work undertaken by the Bureau for the 1926 season.

W. L. Frost, chairman of the finance committee, reported at length as to plans for financing the activities of the bureau during the coming season. The chairman stated that endorsements of the Bureau's plans for 1926 had been given by the Light & Power Association and by the executive committee of the P.C.E.A.

The plan of executing the Red Seal idea consists in brief of the division of the state into twenty-five territorial districts in charge of a chairman and vice-chairman. There will be added to each district committee all of the members of the Electragists International in that district, who will constitute a most important factor in the execution of the plan. House-wiring plans and specifications on which Electragists are called upon to figure will be checked to see whether they conform to the Red Seal standards developed by the Bureau. Those that do conform will be granted preliminary job signs at once while those that do not conform will receive attention at the direction of the chairman of the committee, who will endeavor to induce the house-owner to make such changes in his plans as will raise them to the Red Seal standards. Reports will be sent in to the headquarters of the Bureau at regular intervals giving names of all those house-holders to whom preliminary job signs have been granted. These names will be distributed to all subscribers to the Bureau funds in order that jobbers and manufacturers may follow up these first-class prospects for the purchase of electrical appliances.

At the suggestion of Mr. Sandoval, it was deemed advisable that the attention of all district committeemen be called to the fact that, since the present minimum requirements of the Red Seal plan call for three No. 4 service wires, due note should be taken of the fact that these are adequate to take care of heating and refrigeration load as well as range load. The goal in each home should be to attain as nearly as possible a 100 per cent domestic electrical installation.

The chairman was authorized to consummate the agreement with the Society for Electrical Development that officially will confer upon the California Electrical Bureau authority to act as its agent in the dispensation of Red Seal licenses. It is believed that before the next meeting of the Bureau, which will take place the latter part of January, that the whole Red Seal program will be in effective operation.

Electric Club Sponsors Lighting Activity in San Diego

Directors of the Electric Club of San Diego, Calif., in a recent meeting unanimously resolved to supply the necessary funds to carry on an industrial lighting campaign in that city. They have instructed the secretary to obtain the necessary literature from the Industrial Lighting Committee, National Electric Light Association, and have appointed committees to carry on this campaign actively.

A meeting has been scheduled at which a prominent speaker, a member of the Pacific Coast Division's educational committee, will appear to lay before the organization the plans of the Industrial Lighting Campaign.

While San Diego is not regarded generally as having many large industries, it is planned, nevertheless, to pay more detailed attention to the smaller industries and to the promoting of better commercial lighting.

Oakland Contractors Overflow Lighting Meeting

At a dinner gathering which overflowed the dining room, Oakland contractors, jobbers, manufacturers' agents and power company representatives heard and agreed with the line-up for the Industrial Lighting Activity as presented by the educational and sales committees for northern California, Friday evening, Nov. 13, at the Newport Cafe. The attendance at the meeting was the largest reported for any similar gathering in the district.

L. F. Galbraith, division sales man-

COMING EVENTS

California Electragists, Northern Division—
Quarterly meeting at Sacramento,
Senator Hotel, Dec. 5, 1925

Technical Section, P.C.E.A.—
Conclave—Fairmont Hotel, San Francisco
Jan. 13-15, 1926

Pacific Coast Electrical Association—
Annual Convention—Biltmore Hotel, Los Angeles
June 8-11, 1926

National Association of Railroad and Utilities
Commissioners—
Kansas City, Baltimore Hotel
Feb. 9-12, 1926

ager for the Oakland division, Pacific Gas and Electric Company, presided over the meeting, introducing first, Clark Baker of the National Lamp Works, and chairman of the educational committee, who outlined the plan of the Industrial Lighting Activity from its national as well as state or district aspects.

Felix Butte, vice-president of the California Electragists, was the second speaker, pointing to the interests which contractors might hope to develop through the campaign. Leo Giamini, of the educational committee, and a member of the sales staff of the Edison Lamp Works, gave a demonstration of methods by which contractors might convince prospects of the value of efficient and correct industrial lighting.

E. Zimmerman, Pacific States Electric Company, followed with anecdotes of sales experience, designed to show the value of selling lighting results rather than price of job. H. H. Robinson, electric salesman for the Pacific Gas and Electric Company, told of experiences contractors already were having in the sales of better industrial

and commercial lighting installations. Walter Vance, contractor of Oakland, Clyde Chamblin, president California Electrical Construction Company, and Earl Browne, of the Browne-Langlais Electrical Construction Company, also spoke briefly upon the value of the campaign to the industry.

Harvest Hands Party Put on by Colorado Electrical League

Harvest Hands' Wild West was the appellation given to the recent entertainment of the Electrical League of Colorado in Denver, a combination fall frolic, Wild West show, and general good time, with the advantages of all and the drawbacks of none.

Various games of the days when the West was still a frontier and where chance played a large element proved a big drawing card. The medium of exchange was ornate scrip labelled "volts." County fair attractions, such as candy wheels, horse races and the like, including turkey raffles also were featured.

Entertainment was provided throughout the program in the form of vaudeville acts and included a championship Charleston contest. Dancing closed the program at midnight. An attendance of over 300 was recorded.

The committee which sponsored the affair and was headed by E. P. Kipp consisted of K. L. Francis, Robert Miller, W. L. Kaffer, A. E. Bacon, and Clarence Keller. They were assisted by representatives of one of the American Legion posts in Denver.

Bleak Winner in Rocky Mountain League Golf Tourney

R. M. Bleak, superintendent of lighting and appliance sales of the Utah Power & Light Company, won a handsome loving cup in the electrical golf tournament held in Salt Lake City during June, July and August. The tournament, sponsored by the Rocky Mountain Electrical Co-operative League, was participated in by thirty-six golfers, representing the central station, jobbers, manufacturers and contractor-dealers. Three legs were played, the first in June, the second in July, and the third in August.

A number of prizes were donated by the jobbers and central station branch of the industry, and the loving cup was donated by the manufacturers for low gross for the tournament. A \$10 golf club went to the winner of each leg; a dozen golf balls to the runner-up, and a \$10 club was awarded for low gross.

Following are the results: June leg—won by H. B. Summerhays of the Westinghouse Lamp Company; L. J. Batty, of the General Electric Company, runner-up. July leg—R. M. Bleak, winner; George B. Thomas, of the Utah Power & Light Company, runner-up. August leg—F. H. Young, of the Phoenix Utility Company, winner; J. L. Lawrence, of the Salt Lake Electric Supply Company, runner-up.

Seattle Electric Club Has New Quarters.—The Electric Club of Seattle has secured permanent quarters in the Chamber of Commerce Building, Third Avenue and Columbia Street, where all meetings of the organization hereafter will be held. The club meets Monday of each week at noon, adjourning at 1:30.

Personals

R. R. Cowles, chairman Technical Section, P.C.E.A.; H. L. Doolittle, past chairman Technical Section and now a member of the executive committee; G. A. Riley, chairman overhead systems committee; J. W. Andree, chairman prime movers committee; W. R. Frampton, chairman safety rules committee, who also represented the meter committee and the accident prevention committee; Walter Dreyer, chairman hydraulic power committee; and P. E. Chapman, chairman underground systems committee, all have returned from Detroit where they attended the group meetings of the Technical Section, N.E.L.A.

James R. Cravath, consulting electrical and illuminating engineer, has opened an office at 407 Call Building, San Francisco, in addition to his Richmond office.

F. M. Randlett, formerly with the water department of the city of Portland, Ore., has been appointed district manager for Robert W. Hunt Company, with offices in the Lyon Building, Seattle.

N. H. Callard, who for the past nine years has been associated with the Salt Lake City office of the Westinghouse Electric & Manufacturing Company, has been transferred to the general sales department of that organization in New York City. In his new position he will handle problems pertaining to the co-ordination of work between the various district offices and factories of the company.

J. H. Pengilly of Brown & Pengilly of Los Angeles has moved to San Francisco in order better to serve his business interests in the Western Safety Manufacturing Company of the latter city that is allied with the Los Angeles firm.

F. B. Riley, who has been manager of the cabinet division of the Kelvinator Corporation of Detroit, has been appointed general manager of the commercial division of The Servel Corporation, New York.

R. T. Strong, for the last three years manager for the Westinghouse Electric & Manufacturing Company at Omaha, Neb., has been made manager of the transportation division of that company's Seattle district, succeeding A. W. Eshelby, who has been transferred to the Chicago district. Prior to the war Mr. Strong was connected with the Portland Electric Power Company, Portland, Ore.

E. O. Shreve, district manager, General Electric Company, San Francisco, shortly departed for the East where he will confer with company officials at Schenectady and New York.

H. H. Kerr, W. D. Hardaway, E. Neibe, and C. F. Dwyer represented the Public Service Company of Colorado at the recent convention of Doherty plant operators in Chicago.

B. J. Rowan has recently been transferred from the general offices of the General Electric Company at Schenectady to Denver where he will be assistant to Robert Miller, manager of the company's offices in that city.

Dean K. Chadbourne has been appointed general manager of the Westinghouse Electric International Company to succeed E. D. Kilburn who recently was elected vice-president of the Westinghouse Electric & Manufacturing Company, East Pittsburgh.

P. B. Harris, chief engineer of the Los Angeles Railway, returned early in November from the recent convention of the American Electric Railway Association at Atlantic City. The return trip was made via the Panama Canal.

Robert I. Minson has been made manager of the San Diego branch of the Federal Electric Company, succeeding Herbert Rose who is now in charge of the radio department of Holzwasers, Inc. Mr. Minson was connected with the investigation department of the San Diego Consolidated Gas & Electric Company for nine years and subsequently was with the investment department of the Southern California Edison Company.

Dr. Oskar von Miller, noted hydroelectric and hydraulic engineer of Munich, lately arrived in San Francisco enroute to New York. To Dr. von Miller is due the credit for the establishment in Munich of the German Museum, which is devoted to engineering and other technical subjects, and he has been invited to attend a conference in New York for the purpose of consulting with a number of scientists and engineers interested in establishing a similar museum in



DR. OSKAR VON MILLER

America. Dr. von Miller was one of the experts who accompanied the German delegates to the Versailles conference. Since the war he has been very active in the construction of hydroelectric development projects in Germany made necessary by the taking over of the coal mines by the French. At the present time he is president of the commission in charge of railroads in Germany. While in California Dr. von Miller expressed much interest in the hydroelectric developments there and visited a number of the more important projects.

W. D. Shannon, general superintendent of construction for Stone & Webster, Inc., who has had entire charge of the Baker River project of the Puget Sound Power & Light Company, Seattle, has received recognition of his services through having the body of water formed by the dam named for him. The lake is to be known as Lake Shannon.

W. S. Rugg, general sales manager, Westinghouse Electric & Manufacturing Company, East Pittsburgh, has been made a vice-president of the company.

William Baurhyte, president Los Angeles Gas and Electric Corporation, has returned from an extended tour of the East. On his return trip Mr. Baurhyte stopped at Chicago for a meeting of the executive committee of the National Electric Light Association, of which he is a member as president of the Pacific Coast Electrical Association.

A. L. Spring, for the past several years merchandising specialist of the General Electric Company in Los Angeles, is leaving that company to accept a position as sales manager for the Servel Refrigeration Company. Mr. Spring's headquarters will be in Los Angeles.

J. P. Bowden, Western representative of the Edison Electric Appliance Company, recently made an extensive business trip through Arizona.

A. M. Fitch, Harrison-Fitch Electric Company, Pomona, Calif., was in Los Angeles on business recently.

H. T. Simmons, who has been with the Western Electric Company for a number of years, has been made assistant sales manager of the organization in Los Angeles. P. W. Todt, formerly with the same company in San Francisco, has been transferred to Los Angeles as stores manager.

R. M. Alvord of the General Electric Company, San Francisco, was in Los Angeles on business recently.

Martin L. Pierce, sales research engineer for the Hoover Electric Company, recently gave an interesting talk on "Why People Buy" over a Seattle radio station.

Verne D. Harrison, Pacific States Electric Company, recently returned to Seattle after a two-months stay in Alaska.

J. C. Gaylord, substation designing engineer, and H. L. Sampson, substation engineer, both of the Southern California Edison Company, Los Angeles, not long ago spent some time in the San Francisco Bay region on an inspection tour of local substations.

A. E. Wishon, vice-president and general manager of the San Joaquin Light & Power Corporation, Fresno, Calif., recently visited New York and other Eastern cities. He was accompanied by Mrs. Wishon.

L. G. Gianini, for the past four years connected with the Edison Lamp Works of the General Electric Company, San Francisco district office, has been appointed lighting specialist for that office.

Victor W. Hartley, executive secretary of the California Electrical Bureau, spent several days in Los Angeles recently.

R. E. Fisher, vice-president in charge of public relations and sales, Pacific Gas and Electric Company, San Francisco, recently visited El Paso where he was shown over the properties of the El Paso Electric Company.

Harold K. Fox, construction superintendent, San Joaquin Light & Power Corporation, Fresno, visited San Francisco not long ago.

L. A. Nott, Sangamo Electric Company, San Francisco, lately departed for a trip through the Northwest.

A. C. Cornell, chairman of the Electrical League of Colorado and manager of the Western Electric Company in the Mountain District, has been named a member of the Committee of Fifty sponsoring the annual Community Chest Drive in Denver.

Joseph Wells, of Fobes Supply Company, recently returned to Seattle after a sojourn in Prince Rupert, B. C.

John W. White has been appointed general manager of the recently organized Westinghouse Electric Company of Japan. Mr. White has been in the employ of the Westinghouse company for many years and was formerly manager of the Westinghouse Electric International Company's branch office at Havana, Cuba.

Victor C. Moulton, formerly of the industrial division in the Denver office of the Westinghouse Electric & Manufacturing Company, has been assigned to the southern Colorado territory as company representative with headquarters at Pueblo.

A. J. Johnstone, auditor, and J. A. Rockwood, engineer, Portland Electric Power Company, Portland, attended meetings of the Accounting Section, N. E. L. A., in St. Louis, in October.

F. W. Brownell, comptroller, Puget Sound Power & Light Company, Seattle, went to St. Louis in October to attend meetings of the Accounting Section, N. E. L. A.

C. W. Fick, Northwestern engineer of the General Electric Company, recently discussed "Electricity in the Manufacture of Paper," at a recent meeting of the Seattle branch of the A. I. E. E.

C. V. Allen, formerly manager of the Westinghouse Electric International Company in Mexico, has been elected assistant treasurer of the company, with headquarters in New York City as general assistant to H. A. Carmichael, treasurer. Clayton T. Rogers, sales manager for the Mexican branch, has been named acting manager succeeding Mr. Allen.

J. P. Bowden of the Edison Electric Appliance Company has returned to Los Angeles from a business trip to San Francisco.

H. S. Robertson, vice-president and general manager of the Denver Tramway Corporation, addressed the advisory board of the Electrical Co-operative League in Denver recently.

Robert Wolfers has joined the McGraw-Hill Company, Inc., New York, and will be in charge of directories, lists and a direct-mail department which is being developed to serve McGraw-Hill advertisers. The E. M. F. Electrical Year Book recently has been purchased. Other McGraw-Hill reference publications are McGraw Central Station Directory, McGraw Electric Railway Directory and The Radio Trade Directory. It is planned to extend the directory and list services into other industries now served by McGraw-Hill publications. Mr. Wolfers formerly was connected with The Automobile Trade Directory and Chilton Automobile Directory. J. S. Cortelyou, who for the last year has been devoting his time to the Radio Trade Directory, in future will direct the compilation of all McGraw-Hill directories and lists. Mr. Cortelyou was associated for many years with Mr. Wolfers in the automotive directory business.

J. A. Cannon, auditor; J. M. Bourns, assistant auditor; A. R. Foster, superintendent of collections department; and G. N. Riblet, auditor of stores, attended the annual accountants' convention of the Byllesby Engineering & Management Corporation, as representatives of the San Diego Consolidated Gas & Electric Company. This convention was held in Chicago, Oct. 26-29, inclusive.

A. H. Tracy, electrical engineer, Byllesby Engineering & Management Corporation, recently spent several days with the San Diego Consolidated Gas & Electric Company in connection with engineering contracts now in progress. Mr. Tracy has included in his itinerary all Pacific Coast properties under Byllesby management.

S. P. Russell, part owner and vice-president of the H. B. Squires Company of San Francisco, Los Angeles, Portland and Seattle, was elected unanimously chairman of the San Francisco Bay Cities Chapter of the Illuminating Engineering Society for the new fiscal year. Mr. Squires, who makes San Francisco his headquarters, has been devoting much of his time and attention to the subject of lighting, that very important phase of the electrical industry. He has been connected with that industry practically all of his business life. After graduating from the California School of Mechanical Arts in San Francisco, he went to work in the drafting room of Charles C. Moore & Company, En-

Lewis A. Lewis, president of the Northwest Electric Light and Power Association and sales manager of The Washington Water Power Company, Spokane, recently made a flying trip to Seattle and Boise on matters connected with the range and water heater survey in the Northwest.

V. H. Greisser, chief engineer, The Washington Water Power Company, Spokane, will be in full charge of the company's Chelan Lake power development. Arthur Turner, formerly chief engineer in the Columbia River Basin Survey, will be construction engineer.

Mel Hirsch has been made manager of the newly opened San Francisco branch of the Electric Supply Company of Oakland, Calif.

A. C. Cornell, manager of the Western Electric Company in the Mountain region, visited the Salt Lake City branch of the company several weeks ago.

Obituary

Oliver D. Colvin, for many years connected with railway and power interests in Seattle, recently died in that city. Mr. Colvin was vice-president and general manager of the old Snoqualmie Falls Power Company and the Seattle-Tacoma Power Company, and previous to that time was associated in official capacity with the Seattle Consolidated Street Railway Company and the Rainier Power Company. During the last few years of his life he developed the Seattle Car & Foundry Company.

Arthur Lyman Hawley, for many years connected with electric interests in Seattle, recently died in that city. He was for a number of years manager of the Union Electric Company, which at that time furnished practically all the electric service in the city. He later became interested in municipal ownership.

James S. Walker, Jr., president of the Walker Electric Company, Salt Lake City, Utah, died suddenly Nov. 20. At the time of his death Mr. Walker was president of the Contractor-Dealers' Association.

Charles W. McKillip, for the past twenty years district manager at Sacramento, Calif., for the Pacific Gas and Electric Company, dropped dead in that city, Nov. 20.

George Young Allen, technical assistant to the manager of the radio department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, was killed Nov. 12 in a railroad accident while returning from the fourth annual radio conference at Washington, D. C.

Allen A. Tirrill, consulting engineer of the Westinghouse Electric & Manufacturing Company, and inventor of the Tirrill voltage regulator, died recently at the age of 52. Prior to his connection with the Westinghouse company he was associated with the General Electric Company for many years. In 1914 he was awarded the John Scott legacy medal for meritorious inventions. He was a member of the A. I. E. E.



S. P. RUSSELL

gineers. In 1903 he left there to join the Holland Supply Company, a firm handling steam and electric railway supplies, and a short while later took over the concern. In 1905 he sold out to Johns-Manville, Inc., and took charge of that company's electrical department for the Pacific Coast. A year later he joined the company's New York organization, and in 1907 opened an office for the concern in New Orleans. Returning to San Francisco in 1908, he remained with Johns-Manville, Inc., until 1918 when he became associated with the H. B. Squires Company.

George Barbour, formerly sales agent at Mount Vernon, Wash., for the Puget Sound Power & Light Company, Seattle, has been promoted to be sales manager of the northern district of that company with headquarters at Bellingham, Wash., taking the place of R. W. Lindley, transferred to Seattle as manager of merchandise sales.

TRADE NOTES

R. R. Poppleton, Inc. is the name of a new \$150,000 corporation which has been formed to take over the business and good will of R. R. Poppleton, Portland, and Thompson & Castleton, Seattle. Complete stocks of electrical machinery as well as complete repair shops will be maintained at both places. The Portland business has been established eleven years and the Seattle business seven years. R. R. Poppleton will continue in charge as president and general manager of the business. V. E. Weber will be manager of the Portland branch and Harold S. Smith, formerly with the Pacific States Electric Company at Fresno, Calif., will be manager of the Seattle store.

Link-Belt Company, Chicago, has published an interesting booklet containing the history of the company over a period of fifty years and describing the development of the conveying machinery business, starting with the invention of the Ewart detachable link belt in 1875. The book contains a series of drawings depicting scenes from early times to the present day.

MacRae's Blue Book Company, Chicago, has acquired control of Hendricks Commercial Register, and the next edition will be a general directory, known as "MacRae's Blue Book, consolidated with Hendricks Commercial Register." The consolidated publication will blanket not only the steam and electric railroad field but also the worth-while industries of America, including public utilities.

J. G. White Engineering Corporation, New York City, has published "Petroleum Refining," a booklet which gives a brief history of petroleum and of refining and then presents various views of a complete modern oil refinery, stressing the importance of proper design, construction and operation in increasing efficiency and reducing production costs.

The P. A. Geier Company, Cleveland, has issued a new forty-page sales manual entitled, "Royal Sales Methods, a Handbook of Success," which covers the subject of house-to-house salesmanship. It contains chapters on demonstrating the company's Royal electric cleaner, the structure and care of rugs, and hints contributed by eighteen or more successful retail salesmen.

Driver-Harris Company, Harrison, N. J., has purchased the works and properties of the Electrical Alloy Company at Morristown, N. J., to take care of its increasing business. The Morristown plant will be operated as the Electrical Alloy Division of the Driver-Harris Company, and the main offices and sales department will be located at Harrison.

Erie Malleable Iron Company, Erie, Pa., has issued a small booklet containing the story of the Emico kondu-box line of threadless conduit fittings. The booklet states this new box is so designed as to eliminate costly operations and furnish many economic advantages.

Delco Light Company, 1518 West Pico Street, Los Angeles, has doubled its floor area and rearranged its quarters to provide additional showroom facilities for the sale of electric refrigerators. This store is a factory branch of the Delco Light Company, manufacturers of Frigidaire electrical refrigerators. Ivan de Jongh, local manager for the company, states that the increasing interest in this type of refrigeration for private homes throughout the country has made it necessary for the Delco Light Company to adopt a general policy of expansion for all its sales branches. The Pasadena showroom and salesfloor recently has been moved to larger quarters on Colorado Street opposite the Maryland Hotel to enable the branch to meet the demands put upon it.

The Empire Lighting Fixture Company, of Los Angeles, with J. F. Mortensen at its head, has established a branch retail store and showroom at the corner of East Green and Chester Streets, Pasadena, Calif. This is the fourth store to be opened by this company. Its factory is located at 3160 Glendale Boulevard, Los Angeles.

G. L. Halck Sales Company, San Francisco, has taken over recently the line of the Esler Electric Manufacturing Company, Marion, Ind., that includes heaters, two-way plugs and quad receptacles for table use.

H. M. Byllesby & Company, Chicago, has issued a booklet entitled "Scope and Service," which gives a history of the organization and discusses public utility securities.

General Electric Company, Schenectady, has issued bulletin GEA-103 on street-lighting glassware. The booklet is illustrated profusely with photographs and drawings and contains a complete list of globes with their descriptions.

Roller-Smith Company, New York City, has opened a branch office at 493 No. Boulevard, Atlanta, where the company business will be conducted by the Tennessee Engineering & Sales Company. The Roller-Smith Company also maintains offices at 101 Milk Street, Boston, and 152 Temple Street, New Haven, where the Detweiler-Bell Company is acting as agent.

Western Cedar Association, Spokane, Wash., has issued a large eight-page folder, well illustrated, and describing and presenting the qualities of its red cedar poles.

Trumbull Electric Manufacturing Company, Plainville, Conn., has issued catalog describing and illustrating its new line of panel boards for residence use.

Birkel & Le Gassic, electrical supply jobbers of Santa Monica, Calif., have announced the appointment of A. T. Richardson as office manager. Mr. Richardson was connected formerly with the Wholesale Electric Company of San Francisco.

Edward T. Moore, Syracuse, N. Y., recently has brought out a new model of the Edmoore demand limiter, an electrical device for automatically controlling maximum demands or peak loads on electric power systems.

The Ideal Electric & Manufacturing Company, Mansfield, Ohio, has issued bulletin 110, describing its type "AA" double squirrel-cage automatic self-starting induction motor.

Allis-Chalmers Manufacturing Company, Milwaukee, has announced the Texrope drive which is claimed to be an entirely new type of short-center, flexible drive and an important development in the field of power-transmission machinery.

Delta-Star Electric Company, Chicago, has issued a net price list on standardized outdoor substations. These prices took effect Oct. 15 and will remain in force until March 15, 1926.

Gulf Electric Appliance Company, Inc., Tampa, Fla., distributor for the Wesix hot water heaters and air heaters, has increased its capital stock to \$70,000, also issuing \$50,000 preferred stock to take care of its large field.



Fond memories of times gone by! Gazing at this fine-looking group of Sea Scouts reminds us of the way these energetic youngsters gallantly exercised their sea-going legs and their overstrained vocal chords paging delegates around the convention auditorium in San Francisco during the N.E.L.A. gathering last June.

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

FRIGIDAIRE electric refrigerators are today being sold by Power and Light Companies in more than 250 cities and towns. Thousands of new current outlets are being created each month.

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smiles at heat in this
steel mill of Youngstown
Sheet & Tube Co.,
Youngstown, Ohio.

*For unusual service
under extreme conditions*

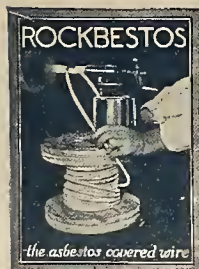
The motors of the traveling cranes are constantly in proximity to the intense heat from these steel ladles. The motors are wound with ROCKBESTOS magnet wire and the insulation is not impaired. Wherever heat is a factor or unusual service is demanded under extreme conditions, including overloads, ROCKBESTOS—the asbestos covered wire, will always stand up and give unlimited service.

BAKER-JOSLYN COMPANY

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Journal of Electricity

With which is consolidated the "Electrical Journal" and the "Journal of Electricity, Power & Gas."
Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication
Published Semi-Monthly
Established 1887

G. R. HENNINGER, Associate Editor
R. N. PHELAN, Associate Editor

C. T. HUTCHINSON, Editorial Director
G. C. TENNEY, Managing Editor

W. A. CYR, Associate Editor
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VOLUME 35

SAN FRANCISCO, DECEMBER 15, 1925

NUMBER 12

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McGraw-Hill Company of California — 883 Mission St. — SAN FRANCISCO
Northwest Office: 1206 Spalding Building, Portland, Ore.
Publishers of JOURNAL OF ELECTRICITY

JAMES H. MCGRAW
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WASHINGTON, Colorado Building
CHICAGO, 7 South Dearborn Street
PHILADELPHIA, Real Estate Trust Building
CLEVELAND, Leader-News Building
ST. LOUIS, Star Building
NEW YORK, Tenth Ave. at 36th St.

Subscription rates in United States, Canada, Mexico, Porto Rico, U. S. Possessions, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Nicaragua, Panama, Guatemala, Paraguay, Peru, Honduras, Salvador, Uruguay, and Spain, \$2.00 per year, 2 years \$3.00. Elsewhere \$3.00 Gold (13 Shillings). Single copy, 25c. When change of address is required, both old and new addresses must be given. Notice must be received two weeks before change takes place.

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By McGraw-Hill Company of California

Entered as second-class matter Feb. 17, 1921, at the Post Office at San Francisco, California, under Act of March 3, 1879.

Member Audit Bureau of Circulation
Printed in U. S. A.

Safe Selling

THERE is a safety zone in industrial selling beyond which a manufacturer cannot go without suffering losses. This border between profitable and unprofitable selling can be set down by any manufacturer whose products are used in industry if he will apply to his particular selling job the McGraw-Hill Four Principles of Industrial Marketing. These principles, as laid down in the seventh of a series of national newspaper advertisements, a copy of which appears on pages 42 and 43 of this issue, are:

1. **Market Determination.** Study each market for your product. Weigh its potential. Determine which industries are the profitable ones to cultivate. The place to start is with your own books. Classify your sales by natural buying groups. Then compile data on each industry in which your product can be used. Compare the two and you will see clearly where your biggest opportunity lies.
2. **Buying Habits.** Study the buying habits of the industries you decide to sell. Find out who are the buyers and how they buy. This will save the expense and wasted effort of "barking up the wrong tree."
2. **Channels of Approach.** Having located the real buyers direct your selling on them. Support your sales effort with advertising in the publications which have the greatest influence with these buyers—the ones they look to for information.
4. **Appeals that Influence.** Don't talk generalities in your advertising. Talk shop in the buyer's own language. Tell them how your product will increase the productiveness of their plants or will reduce costs. Performance facts are what interest them most.

Should a manufacturer desire to apply these principles to his 1926 market, a copy of the book "Industrial Marketing" will be sent upon request.

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Publishers of

American Machinist—European Edition

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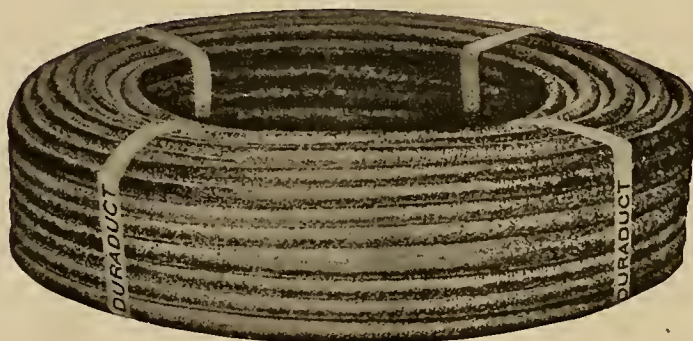
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Contractors Choose DURADUCT Because—



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EDITORIAL

The Customer-Owner and the Holding Company

IN the scant eight years since the inception of the customer-ownership idea the industry has come to look upon this movement as a panacea for almost all real or imaginary disruptions in the public relations system. This attitude is thoroughly justifiable, for theoretically and practically a satisfied group of customers owning securities in the utility which furnishes them an essential service is a distinct asset. Moreover, the value of this asset increases in direct proportion as these customer-owners are made to feel that they are partners in the business and as such are entitled to the rights of partnership in more than the mere sense of receiving quarterly dividend checks.

With a utility locally owned and locally managed in the fullest sense of the word such a situation undoubtedly holds. Under such circumstances a customer-owner enjoys a feeling of pride in his utility that will manifest itself in an immediate rise to the defense of the company should its position become jeopardized through an attack by politicians or others unfriendly to its interests.

But what happens to this feeling of pride and partnership when a local utility is absorbed by a holding company whose headquarters are thousands of miles removed, as in the case of the holding companies which recently have taken over some of the Pacific Coast utilities? As one utility executive recently put it, is not the customer-owner likely to feel his partnership was rather a hollow affair in the first place, that as a partner he was neither consulted nor considered? Add to this his suspicion when through the financial pages of the press he sees the fluctuations of the common stock—would he not be justified in thinking that he has been treated unfairly?

In the case of those utilities which have been taken over by holding companies, it would seem that the problem which they now face is one of reselling the customer-owner. He must be made to feel that the affiliation of his company with a national organization has strengthened its position; that this affiliation in no sense has altered his position as partner in the business. This can be done by taking the customer-owner into confidence even more fully than has been the practice in the past. It would be a comparatively simple matter to address a letter to him directing attention to the improvements which the utility is making. The employee who sold him his securities in the first place could call on him every so often, pointing out additions the company is making in his neighborhood and asking him if he has any suggestions regarding

service or management which his position as a partner entitles him to convey to those who are running the business for him. Even the telephone could be used under the circumstances to give him assurance that his opinions are both desired and valued.

Nor is this a problem of the utilities mentioned alone. All companies which have adopted the customer-ownership idea could well afford to devote some thought and attention to keeping the customer-owner sold.

The Ontario Bubble Bursts Once Again

“THE Ontario Hydro-Electric system is customarily represented as an experiment in ‘public ownership’. It is really an attempt on the part of a small number of politicians to establish an industrial monopoly and to manage this monopoly in such a way as to keep themselves in power. In order to effect this object they have violated constitutional law and practice; they have assumed absolute authority; they have closed the courts of justice against proceedings adverse to themselves, and they have encroached upon the liberties of the people.” Rather a strong indictment of a project with which politicians have cajoled and beguiled the American voter for 10, these many years. But an indictment nevertheless because it comes from the pen of the late James Mavor, emeritus professor of political economy in the University of Toronto.

For those of our readers who feel that Professor Mavor may not have made his case against the Hydro-Electric Commission sufficiently strong, we will quote one more passage from his new book, “Niagara in Politics,” and refer them to the review of this work on another page of this issue:

“They (the Hydro Commission) have saddled the Province with an enormous debt on account of a group of enterprises, the returns from which must be, in the nature of the case, of a fluctuating and speculative character. They have embarked upon a series of complicated industries for the management of which they have exhibited no aptitude and for which they have had none of the necessary training and experience. They have . . . voted themselves large salaries for their incompetent labors. They have in many cases broken promises solemnly made. Instead of reducing the cost of power, there are signs that they must ere long increase that cost to the consumers. The temporarily low rates cannot be maintained or the enterprise must become insolvent. The eventual economic loss may be very considerable; but the political injury which they have already inflicted upon the public life of the

Province is the most important fact adverse to their credit and to the credit of the people and the press who have placed their necks blindly under the yokes of the politicians."

Undoubtedly Professor Mavor's book will arouse a greater storm of invective and criticism from the politicians and their friendly press than the well known Murray and Flood report of 1922 or the more recent Wyer report on the affairs of the Commission. There are many reasons why such criticisms and any amount of rebuttal which the Commission might offer will fall short of its mark. In the first place Professor Mavor makes few, if any, statements regarding the Commission which are not substantiated by either the recorded word of government officials or by written reports and official documents. Secondly, his earlier work, "An Economic History of Russia," established him as an international authority on political economy. Lastly, he has resided for years in Toronto, the chief city of Ontario, where he has had an opportunity of observing closely the creation and the growth of the Hydro-Electric Commission and of studying its effect upon both the people and the government.

Because the alleged success of the Ontario project has been one of the chief weapons of the political proponents of state and municipal ownership in the Pacific Coast states, "Niagara in Politics" will be welcomed by the electric light and power industry as well as by students of political economy. We recommend it not only to both of these classes but also urge a conscientious study of its pages by those newspaper editors whose columns would lead the public to believe that by following in the footsteps of Ontario California, Oregon and Washington will find a political millenium.

A Discussion

—and a Debate

NOT since the National Electric Light Association convention has there been a meeting in the West of more significance to the electrical industry here than that held in Seattle recently by the Western Division of the Chamber of Commerce of the United States. We refer to the session devoted to the hydroelectric power situation in the West reported elsewhere in this issue. The foregoing statement is made advisedly in view of the fact that a group of bankers, business men, newspaper editors and Chamber of Commerce officials heard a remarkable presentation of the development of the industry under private ownership coupled with a debate on the subject in which there was no mincing of words and spades were called spades.

A moving picture, in the production of which eminent engineers on the Coast had collaborated using the latest art in motion picture production, portrayed the development of the industry in the past forty-five years in a manner described by spectators as the most forceful graphic presentation of this industrial phenomenon yet produced. Supplementing and enlarging on the picture, the story of private enterprise was told by R. H. Ballard, vice-president, Southern California Edison Company and O. B. Coldwell, vice-president, Portland Electric

Power Company, representing their respective districts, while the development under municipal operation was ably presented by J. D. Ross, superintendent, Seattle municipal power system, and Ralph Criswell, Los Angeles city councilman. Sandwiched between the last two was Norwood Brockett, director of public relations, Puget Sound Power & Light Company, whose telling arguments against municipal ownership were delivered with his characteristic "punch" in certain and specific language.

With this array of talented speakers placed opposite one another on the program, it may be imagined that the meeting took on some of the aspects of a good boxing card, in which the contestants stood off and hammered each other instead of rushing into clinches. No referee rendered a decision and the audience was generous with its applause for all contestants, but if we are any judge of reactions, private enterprise had the edge.

Broadening Our Scope of Service to the Industry

ON another page of this issue is announced the consummation of an arrangement between the Journal of Electricity and the Northwest Electric Light and Power Association identical with that now existing between the Journal and the Pacific Coast Electrical Association. The Journal of course is gratified at the action taken in the Northwest, partly because it would seem that our judgment in placing a representative in that territory, the more intensively to cultivate it editorially, has been vindicated. But more particularly we are gratified at the opportunity presented to broaden our scope of usefulness.

We long have realized the importance of that great section of the West and recognized the value to the industry of the work done by its association. Now that that association sees fit to utilize our services more fully we may feel that we are assisting in its work, and our part in furthering the interests of the electrical industry becomes the more important. Thus acknowledging the added responsibilities entailed, we pledge ourselves to discharge them diligently.

Why Not First Aid?

WE read in a recent issue of a Sacramento Valley paper that a young man who was operating a ditch-digging machine met his death when the boom of the machine came in contact with a high-tension line. The fact of itself unfortunately is not uncommon. That which arouses special comment is the statement of the press that medical aid was summoned but that the victim died in the meantime. This points directly and unequivocally to the fact that if any one of the construction crew had been familiar with the Schaefer method of resuscitation the young man probably would have recovered.

Much credit is due to those far-seeing persons in the industry who are spreading this gospel even in the face of shortsighted opposition. It is to be

hoped that a knowledge of this important first-aid measure soon will find its way not only to all corners of the electrical industry but through it to other fields.

Ice Men Will Not Be Left in the Cold

THAT the ice manufacturers of the United States estimate their losses, due to household electrical refrigerators, to be about \$10,000,000 for the year; as a report made at the recent convention of the National Association of Ice Industries at Los Angeles shows, is a matter worthy of considerable attention both from the standpoint of the ice manufacturer and that of the electrical industry. To the ice men the question is one of grave concern. To the electrical industry it is an indication of the trend toward electrical household refrigeration which is just beginning to become notable. To the former it presents a menace to their business, and to the latter an opportunity undreamed of a few years ago.

The problem has its delicate angles. It has not been long since the ice manufacturers recognized that electricity was the ideal motive power for the operation of their plants. And now the new friend, as it were, appears to turn upon them. Yet it is impossible to turn back now, even if it were desirable. Domestic refrigeration has come to stay, there is no longer any doubt of that. It offers to the housewife too many advantages over the old methods of refrigeration not to supplant ice for a clean, quiet, efficient and constant electric servant.

Be it said to their credit, the ice manufacturers through their committees seem to favor a common-sense and constructive attitude in the matter. Their committee, in its report at the Los Angeles convention, as well as in the discussion following the reading of that report, favored a policy of non-antagonism, and one rather of co-operation with the electrical industry in the extension of the use of any and all kinds of refrigeration in the home.

That many ice manufacturers indicate a desire and indeed are planning a genuine effort in the selling of electrical household refrigeration machines is a commendable tendency. It would be useless, although perhaps natural enough, to attempt to discredit their electrical competitors. Such a policy would reflect badly upon their own business and hurt refrigeration in general.

But the idea of going into the merchandising field themselves to place electric refrigerators in the home where they find a desire for such places them in a most creditable light, both from a position of public relations and in relation to the electrical industry as well.

And although in a naturally favored position in respect to future refrigeration development, it behooves the electrical industry to show itself fair and gracious. For although favored of fortune in this instance, the good will and good opinion of the ice industry are worth more to the electrical industry than any temporary commercial advantage it may happen to enjoy by reason of public preference. As

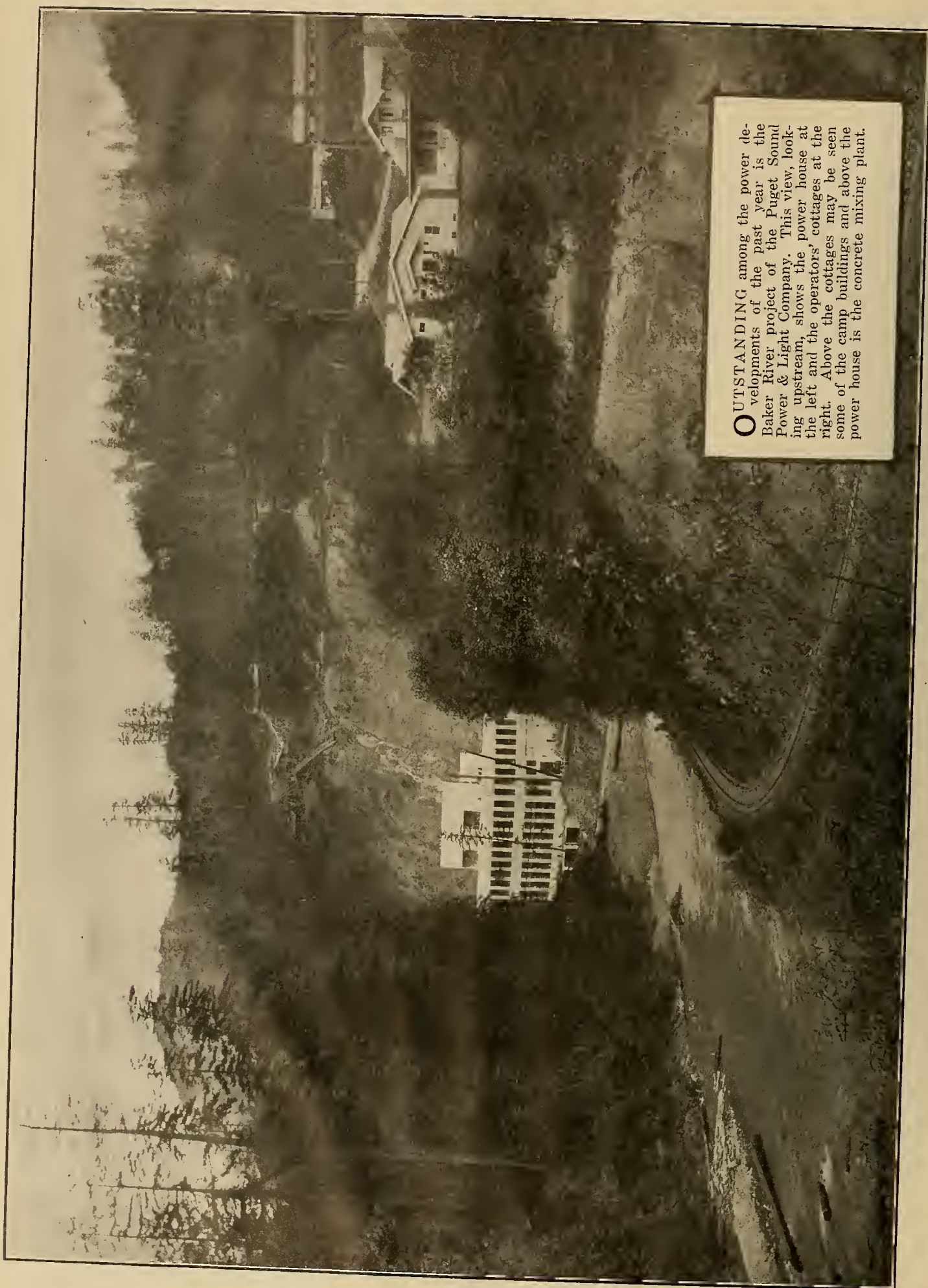
builders of community development, it is to the interest of the utility companies to protect and foster the interests of all members of their communities, and the ice manufacturers as such demand the utmost consideration in a situation which threatens their welfare. Co-operation between ice manufacturer and electrical industry can bring about a mutual development which eventually will be to the best interests of each community.

New Inspectors' Association Merits Support

A NEW association being formed in the Northwest is worthy of the support of the electrical industry. We refer to the Northwest Association of Electrical Inspectors to appear on the scene in January when the first meeting will be held in Portland, as disclosed in a news item in this issue. It is understood that the efforts of the organizers, F. D. Weber, of the Oregon Insurance Rating Bureau, Portland, and H. A. Patton, of a similar bureau in Seattle, are meeting with some success, and that the infant organization will start life with a robust body and healthy mind, and this is all we could wish for any new-born babe.

Regulation and inspection of electrical installations have long been with us and are here to stay. For the most part, wiring codes and insurance requirements have been welcomed by the industry and have done much not only toward the reduction of fire and personal hazard, but also for the general good through standardization of equipment and practices and through education of the contractor and public. As an example of this we would cite the city of Portland, whose code is recognized as being among the best municipal codes in the country, and among those adequately administered. Year after year has witnessed improvement in the standards of wiring and increase in the use of electrical energy in that city, in spite of the fact that neither electric club nor contractors' association has ever been long-lived there. After giving due credit for this improvement to the educational work done among the contractors and public by the power companies, it will be admitted that the code and its administration likewise have been a large contributing influence.

If results in Portland have been reasonably satisfactory in this respect without formal organization to foster the movement, it is because Portland is among the few proverbial exceptions. Generally speaking, such improvements are more or less directly proportionate to the organized co-operative effort exerted in their behalf, and it is quite possible that even in Portland the industry might expect to benefit from an organization of electrical inspectors that will draw to it other elements of the industry interested in the inspectors' problems. Certainly there is room for improvement everywhere, and because the Northwest is not over-organized with clubs, leagues and associations, it would seem that this new organization should find a definite place in the scheme of things there. We wish it success.



OUTSTANDING among the power developments of the past year is the Baker River project of the Puget Sound Power & Light Company. This view, looking upstream, shows the power house at the left and the operators' cottages at the right. Above the cottages may be seen some of the camp buildings and above the power house is the concrete mixing plant.

The Baker River Development

A Discussion of the Hydraulic Features

By William D. Shannon

General Superintendent, Division of Construction and Engineering, Stone & Webster, Inc.,
Seattle

BAKER River is one of the most important branches of the Skagit River system, all of which is situated in the northern part of the state of Washington and in southern British Columbia. This river has a drainage area of 270 sq. mi., of which approximately one-eighth is above El. 5,000, U.S.G.S. datum. It rises on the southern slope of a spur of the Cascade Mountains between Mt. Baker and Mt. Shuksan. The former is an extinct volcano rising to a height of 10,750 ft. and the latter rises to a height of 9,038 ft. Both are covered with perpetual snow and have numerous glaciers which aid in storing the precipitation during the winter months. Mt. Baker, the higher of the two, has more extensive snow and ice fields, but both contribute greatly to the summer run-off of the Baker River watershed. Very little snow falls on the lower reaches of the river, but in the sheltered portions of the river basin snow is found throughout the winter months down to an elevation of 500 ft. above sea level. Snow occasionally falls over the entire basin, though snow falling below El. 500 as a rule does not stay on the ground any great length of time.

Only some 20 miles in length and an average of one-half mile in width, the valley of the river is flanked by high mountain ranges on both its east and west sides. At the upper end of the valley the terrain rises rapidly to the summits of the surrounding mountains. This whole country is distinctly mountainous and abounds in water courses which have their origin either in springs or in the melting snow and ice. The lower portions of the watershed are covered with huge gravel and clay deposits and the upper reaches are largely of volcanic origin, there being a large number of lava flows showing above the strata of limestone and other native rock.

Eroding its channel all the way from the summit of the mountain range to the river's confluence with the Skagit, the Baker River, in a number of places along its length, has cut deep gorges through the various strata of solid rock. In one of these

UNIQUE among power developments of the Pacific Coast is the Baker River project of the Puget Sound Power & Light Company. Geological and other natural features made the site almost ideal. A narrow rock-walled gorge for the dam site, a bed of gravel at the lower end of the reservoir site, a short tunnel and this through tight rock, a cement mill within a mile of the project, and the presence on the property of concrete warehouses of an abandoned mill are some of the unusual features.

narrow canyons is located on the Baker River development.

Rainfall on the Baker River watershed is typical of a number of areas in the Puget Sound Basin. On the lower reaches of the river the precipitation is very largely in the form of rain while on the upper reaches of the basin it is almost entirely snow during the winter period. Precipitation in the upper portion of the watershed is probably as high as 200 in. a year, though no actual data other than the river flow are available. Table No. 1 shows the precipitation for the

month of February, 1925, which is typical of the winter season in the lower reaches of the river. During this same month it is probable that the precipitation in the upper basin was very much greater than this.

Table No. 1

Typical Precipitation and Average Temperature at Site of Baker River Development, February, 1925.					
Date		Precip.		Temp.	
Feb. 1.....	1.09	41	Feb. 16.....	.....	41
Feb. 2.....	.68	42	Feb. 17.....	.....	43
Feb. 3.....	.89	43	Feb. 18.....	.....	43
Feb. 4.....	.87	37	Feb. 19.....	.11	40
Feb. 5.....	.44	40	Feb. 20.....	.56	40
Feb. 6.....	.30	38	Feb. 21.....	.50	42
Feb. 7.....	.40	42	Feb. 22.....	.70	42
Feb. 8.....	.87	38	Feb. 23.....	.43	42
Feb. 9.....	.06	39	Feb. 24.....	.28	42
Feb. 10.....	.08	38	Feb. 25.....	.74	40
Feb. 11.....	.....	37	Feb. 26.....	.85	41
Feb. 12.....	.....	45	Feb. 27.....	.12	40
Feb. 13.....	.....	45	Feb. 28.....	.....	40
Feb. 14.....	.02	43			
Feb. 15.....	.....	40			
			Total.....	9.99 in.	
Average .357 in. per day.					

Table No. 1 also shows typical daily winter temperatures at the site of the Baker River power plant during the month of February, 1925. During that month there was practically no freezing weather and very little frost to contend with at that point. There may be an occasional week during the winter months when the temperature gets below the freezing point, but such is the exception rather than the rule. On the upper reaches of the river, however, the weather gets extremely cold and this fact tends to hold back the snow and ice during the winter months.

Table No. 2 shows the temperature during the month of June, 1925, and is typical of the summer

months in the region of the plant. It is during the months of July and August that the melting snow and ice augment the normal river supply which otherwise by that time would have been decreased greatly owing to the decreased rainfall.

Table No. 2

Mean Temperatures at Baker River, June, 1925.

Date	Temp.	Date	Temp.
June 1.....	55	June 16.....	64
June 2.....	55	June 17.....	60
June 3.....	51	June 18.....	59
June 4.....	51	June 19.....	51
June 5.....	56	June 20.....	65
June 6.....	59	June 21.....	66
June 7.....	58	June 22.....	64
June 8.....	61	June 23.....	59
June 9.....	57	June 24.....	64
June 10.....	60	June 25.....	72
June 11.....	54	June 26.....	80
June 12.....	60	June 27.....	67
June 13.....	53	June 28.....	60
June 14.....	54	June 29.....	58
June 15.....	62	June 30.....	60

Run-off

Owing to the rocky character of the Baker River watershed the run-off is proportionately high compared to the rainfall. The average run-off for the upper portion of the watershed between 1911 and 1924 was 11.15 sec.ft. per sq. mi. At times of heavy rainfall there often occurs a warm southeastern wind, known locally as a Chinook, which melts the new fallen snow on the mountains. This, together with the heavy rainfall on the lower reaches, tends to bring a heavy run-off on the river and floods result. At such times the stream flow at the power site is as high as 27,000 sec.ft., this figure being estimated for Dec. 29, 1917. Flood conditions sometimes last for three or four days. During some winters there may be as many as two or three of these floods, but as a rule there is not more than one such condition during any one season. However, there may be some minor floods due to heavy precipitation alone.

Table No. 3

Stream Flow at Site of Baker River Development, July, 1922.

Date	Stream Flow	Date	Stream Flow
July 1.....	3,590 sec.ft.	July 16.....	2,075 sec.ft.
July 2.....	4,020 "	July 17.....	2,295 "
July 3.....	4,670 "	July 18.....	2,400 "
July 4.....	4,670 "	July 19.....	2,395 "
July 5.....	4,140 "	July 20.....	2,070 "
July 6.....	3,870 "	July 21.....	1,860 "
July 7.....	3,420 "	July 22.....	1,670 "
July 8.....	2,900 "	July 23.....	1,540 "
July 9.....	2,580 "	July 24.....	1,620 "
July 10.....	2,400 "	July 25.....	1,675 "
July 11.....	2,400 "	July 26.....	1,675 "
July 12.....	2,460 "	July 27.....	1,720 "
July 13.....	2,700 "	July 28.....	1,810 "
July 14.....	2,480 "	July 29.....	1,860 "
July 15.....	2,240 "	July 30.....	1,915 "
		July 31.....	1,915 "

Note.—Watershed area = 270 sq. mi.

Table No. 4

Stream Flow at Site of Baker River Development, January, 1918.

Date	Stream Flow	Date	Stream Flow
Jan. 1.....	20,200 sec.ft.	Jan. 16.....	1,950 sec.ft.
Jan. 2.....	15,200 "	Jan. 17.....	3,930 "
Jan. 3.....	12,200 "	Jan. 18.....	7,960 "
Jan. 4.....	13,100 "	Jan. 19.....	6,600 "
Jan. 5.....	13,500 "	Jan. 20.....	3,820 "
Jan. 6.....	9,050 "	Jan. 21.....	2,510 "
Jan. 7.....	9,240 "	Jan. 22.....	2,330 "
Jan. 8.....	7,300 "	Jan. 23.....	2,240 "
Jan. 9.....	4,160 "	Jan. 24.....	1,950 "
Jan. 10.....	2,860 "	Jan. 25.....	2,060 "
Jan. 11.....	2,390 "	Jan. 26.....	1,950 "
Jan. 12.....	2,590 "	Jan. 27.....	1,850 "
Jan. 13.....	2,210 "	Jan. 28.....	1,700 "
Jan. 14.....	2,105 "	Jan. 29.....	1,660 "
Jan. 15.....	2,000 "	Jan. 30.....	1,615 "
		Jan. 31.....	1,560 "

Note.—Watershed area = 270 sq. mi.

In the summer months of July and August the river is fed entirely by springs and the melting

Table No. 5

Flow of Baker River at Anderson Creek Station. Area of Watershed = 184 sq. mi.

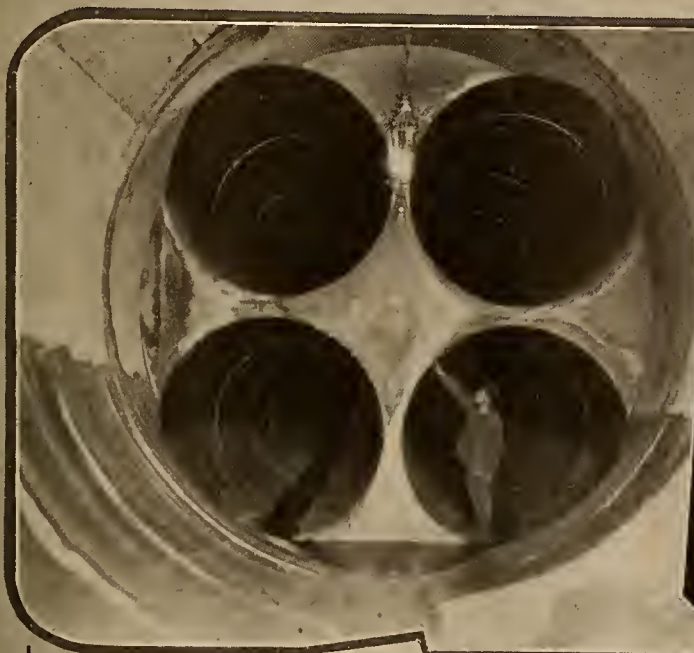
Year	Stream Flow in Sec.ft.			Mean Run-off per Sq. Mi. in Sec.ft.	Total Annual Run-off in In.	Total Annual Run-off Acre-ft.
	Maximum	Minimum	Mean			
1911	.....	410	2,250	12.2	166.39	1,630,000
1912	6,280	524	1,940	10.5	143.28	1,410,000
1913	7,750	457	2,200	12.0	162.22	1,590,000
1914	22,700	431	1,970	10.7	145.77	1,430,000
1915	17,200	554	1,660	9.0	122.07	1,200,000
1916	12,600	525	2,190	11.9	161.69	1,590,000
1917	7,600	508	1,910	10.4	141.36	1,390,000
1918	27,400	505	2,600	14.1	191.74	1,880,000
1919	14,800	591	1,980	10.8	146.24	1,440,000
1920	16,000	220	2,000	10.9	147.58	1,450,000
1921	17,800	660	2,350	12.8	173.40	1,700,000
1922	19,600	398	2,030	11.0	149.84	1,470,000
1923	9,510	.....	1,790	9.7	132.19	1,300,000
1924	16,700	460	1,830	9.9	134.98	1,330,000
14 Year Average.....				11.15		

snows and may drop to 1,200 sec.ft. Table No. 3 gives the stream flow of Baker River at the powerhouse site during a typical summer month. Table No. 4 shows the same during a typical winter month. If the fall rains are late for any reason an occasional dry spell may bring the river down to as low as 700 sec.ft. As a rule this low-water period lasts but a short time and occurs only infrequently. One extraordinary low-water period brought the river down to 220 sec.ft., yet notwithstanding this the yearly mean run-off was up to normal. Table No. 5 gives the annual flow of Baker River at a point eight miles above the power site and also gives the maximum and minimum stream flow for all years from 1911 to 1924.

Storage

The area of the water surface of the reservoir when filled to El. 405 will be 1,805 acres. The maximum depth of the reservoir is at the dam and is 200 ft. It is planned to operate the reservoir with the surface of the water in the range between 360 and 405, giving a maximum draw-down of 45 ft. and a useful storage of 70,000 acre-ft. above El. 360. From October through the end of July it will be rare indeed that water will not be going over the spillway of the dam. Occasionally there may be a period in midwinter when a spell of cold weather may hold back the stream so that it might drop to 1,500 or 2,000 sec.-ft. At rare intervals it has been known to drop for a few days to 600 sec.ft. As a rule, however, such periods last but a short time, and any intermittent floods will keep the reservoir more than full except under the special conditions noted. The months of August and September, therefore, will require water to be taken from storage, and during these months the reserve supply will be drawn upon.

During these two months in any average year the run-off at the power site will be 1,200 sec.ft. From storage may be taken 1,100 acre-ft. per day for a period of 60 days, or a daily draw-down of 550 sec.-ft., making a total of 1,750 sec.ft. continuously available for power. On a 50 per cent load factor, which is probably during August and September, 3,500 sec.ft. may be drawn off for power purposes. Early fall rains often come in September, so it is doubtful if storage is necessary for an average of more than six or seven weeks annually.



HYDRAULIC features at Baker River involve some novel arrangements as shown in the accompanying illustrations. Due to peculiar economic conditions no special manifold design was warranted. The design adopted (1) was a perfectly blunt take-off between tunnel and penstocks, the only gradation being a slightly tapered nose at the center. Narrowness of the gorge in which the dam was built is indicated in (2), a downstream view. The close proximity of power house to dam is shown in (3). A finished inside diameter of 22 ft. is provided in the main pressure tunnel (4). Upstream view (5) of dam, showing intake.

Dam

The dam is of the semi-gravity arch type, built of mass concrete with a spillway through control gates along the crest of the dam. The upstream face of the dam is laid out on a radius of 250 ft. and the entire cross-section of the dam likewise is swung on the same center. The width of the river level is about 150 ft. and the length of the crest approximately 400 ft. The normal spill crest of the dam is at El. 393 and is divided into spillway sections 10 ft. wide in the clear. These sections are separated by piers 18 in. wide and 29 ft. high. These piers are slotted and fitted with 10 x 12-ft. gates which bring the maximum spill crest to El. 405. The gates are raised and lowered by a mechanical device which travels on the top of the piers. The gates can be kept open during the flood periods of the river and so operated during the low-

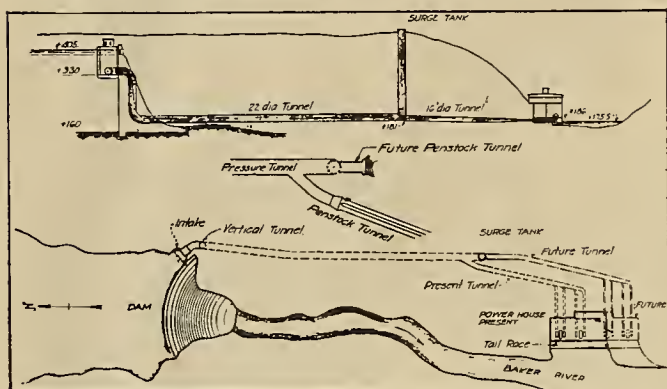


Fig. 1. Plan and sectional elevation showing the general scheme of development. Insert shows provisions for future extension made just below the surge chamber.

water period that the water in the reservoir may be conserved. The total height of the dam is 263 ft. from bedrock to the top of gate piers or 234 ft. to the spillway crest. The lower portion of the downstream face of the dam is constructed on a vertical curve of 106-ft. radius, which curve is tangent to the apron. The total width of the cross-section of the dam at the point of maximum depth, including the apron, is 180 ft.

The dam is located at the upper end of Baker River canyon, which is a gorge with nearly vertical sides over 300 ft. deep. The ridge through which the river has been cutting its way for ages is of limestone formation with occasional strata of shale. This formation provided excellent abutments. The bed of the stream is of solid limestone cut up more or less with pot-holes and ridges, the harder strata of limestone resisting erosion more than the softer rock. This effect resulted in a roughened condition of the stream bed and made possible an excellent bond with the footing of the dam.

Bedrock was found over the entire bottom of the dam at an average of 35 ft. below the bed of the river. Before excavation for the dam could proceed it was necessary to drive a diversion tunnel 17 x 24 ft. in cross-section from a point some 200 ft. above the upstream face of the dam to a point 300 ft. below the downstream face. The intake for the diversion tunnel was driven well below the bed of the stream so that when the final shot was made in

the rock wall separating the tunnel from the river bed over two-thirds of the stream flow was diverted at once.

As soon as the diversion tunnel was placed in use the work of constructing the upstream cofferdam was begun. This structure was built of 10 x 10-in. timbers laced together both longitudinally and transversely to the stream. The crib work was divided into two portions. A double crib on the downstream side and single crib on the upstream side were filled with rock. The space in between the double cribs was puddled with clay, the puddle chamber first being lined with 2-in. planking. This whole arrangement made a very tight dam that successfully withstood several floods and made possible the pouring of concrete on the upstream portion of the dam. The downstream crib never was any more than a simple structure.

The downstream crib never was any more than a simple structure.

Once during the construction of the dam, the engineers received a severe setback to their plans due to a strike started by the I.W.W., one of their demands being a boycott on California fruit. Other demands of like character showed that the strike was simply an excuse to inflict damage on the power company. The bottom of the dam site had been uncovered and one or two pours of concrete had been made. The strike occurred just at a time when one more week's placing of concrete would have put the masonry well above the upstream cofferdam. It was a discouraging day when the strike conditions became such that it was necessary to pull the pumps and flood the cofferdam. This act on the part of the strikers cost the workmen several months of employment when work was scarce over the winter months and cost the job some four months' delay in completion of the dam. Notwithstanding this, however, the whole project was completed within the original time estimate.

An incident is mentioned just to show how often the plans of "mice and men gang aft agley." During the early stages of the construction work a pile trestle some 700 ft. long was thrown across the Baker River to connect the main workings with the sand and gravel plant. The plant and bridge were no sooner placed in operation than the worst flood in several years swept down the river and partially wrecked the bridge and at the same time put the river in a new channel. This necessitated rebuilding the bridge at a month's loss, thereby reducing the engineers' factor of safety in building time. The lost time, however, was made up during the later portion of the job. The gravel plant produced and the bridge safely carried over 250,000 cu.yd. of sand and gravel all of which was used in the construction of the dam, tunnel, power house and other works.

Tunnel Intake

Located on the east side of the canyon and adjacent to the upstream face of the main dam is the intake to the pressure tunnel. The gates controlling the inflow of water are protected by a bank of rack bars 50 ft. in width extending from the sill of

the gates at El. 330 to the floor of the gate house at El. 435. Motor-operated rakes are provided to remove accumulated trash. There are two gates each 12 ft. in width by 20 ft. in height made of plate steel faced with brass liners. These gates are raised and lowered by means of hydraulic cylinders operated by oil pressure supplied at 1,500 lb. per sq. in. through a Watson-Stillman high-pressure pump. One of the gates is so designed that it may be opened or closed under an unbalanced pressure. The other gate will be opened and closed only when the water pressure is balanced. Stop logs are provided in front of the gates for emergency use. The gates close the two intake openings which are roughly two halves of a circle separated by a concrete wall, and which merge into a single circular tunnel about 20 ft. back of the gates. The tunnel then turns directly downward to an intake shaft 22 ft. in finished diameter which goes to the bottom of the pressure tunnel. In order that the tunnel may be filled without opening the large gates, the 24-in. bypass gates are provided at El. 360.

Pressure Tunnel and Penstocks

From the intake shaft the pressure tunnel extends on through solid limestone formation to a circular forebay or surge chamber. The total length of tunnel is 890 ft. The tunnel was bored actually 24 ft. in diameter but has a finished inside diameter of 22 ft. The size of this tunnel is sufficient to carry water for four units at $10\frac{1}{2}$ ft. per sec. based on total consumption of 4,000 sec.ft.

Beyond the surge chamber the tunnel extends some 50 ft. at a reduced section of 16-ft. diameter. This extension is to provide a connection for future units. A plug or seal is provided at the end of this extension to prevent leakage and to enable the completion of the rest of the tunnel beyond the seal at any time. In this way extension work for the future two units may be carried on at any time without interrupting operation of the present units.

About 65 ft. north of the surge chamber a branch tunnel takes off that also is 16 ft. in diameter. This tunnel extends some 230 ft. to a bell-mouth into which are sealed the four penstocks for the present two units. No attempt was made to obtain a particularly smooth transition from the 16-ft. tunnel to the four 8-ft. steel penstocks. The bell-mouth flare of the tunnel and a fairly blunt nose covering the cross-shaped concrete filler between the four pipes are the only attempts at smoothing out the flow line. It was believed that the additional construction investment necessary to provide a fully stream-line flow surface at the manifold was unwarranted. Figs. 1 and 2 indicate the construction methods and design used.

As noted above, the surge chamber is located at the lower end of and directly over the pressure tunnel. It is constructed through solid limestone with the exception of the top 50 ft. which is in heavy blue clay. The finished inside diameter is 20 ft. and the elevation at the top is 450. The surge chamber is only 500 ft. from the water wheels, giving most excellent hydraulic effects and reducing the tunnel and pipe line losses to a minimum.

There are two penstocks to each unit. Each penstock is 8 ft. in diameter throughout its length except for a short taper section immediately ahead of the turbine scroll case. At this latter point the

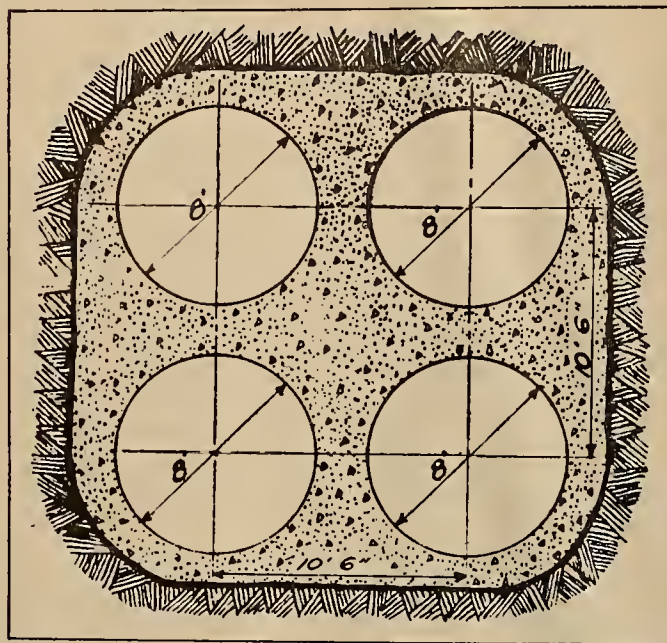


Fig. 2. Sectional view of the penstock tunnel at the point of transition between the circular section and the four penstocks.

section is reduced to 7 ft. and an 84-in. Allis-Chalmers butterfly valve fitted. The penstocks open directly into the tunnel, there being no gate on the upstream end of the pipe lines. Penstock sections were made in 15-ft. lengths to facilitate handling during construction. All circular joints are single-riveted lapped joints while all longitudinal seams are triple-riveted lapped joints. One-inch button-head rivets were used throughout, the thickness of metal being $\frac{1}{2}$ in. through the entire line. The 1,400 ft. of penstock pipe was supplied by the Puget Sound Machinery Depot of Seattle.

In order to maintain the seal of the draft tubes, the minimum elevation of the surface of the tail water will be 175.5. This will give a gross head of 229.5 ft. when the reservoir is full and 184.5 ft. at maximum draw-down of the reservoir.

Such information as can be obtained from observers and from high-water marks in the canyon indicate that extreme floods may raise the water in the river, at the power-house site, up to El. 200. Of course the erection of the dam and power house will provide means of regulating the flow of the river to a considerable extent, but the walls of the power house are being constructed with a view to resisting floods up to El. 203.5.

The construction of the Baker River project was under the direction of the Division of Construction and Engineering of Stone & Webster, Inc. In this division S. L. Shuffleton is Western manager, G. P. Jessup superintendent of construction, W. F. Brown assistant superintendent of construction, L. D. Zimmerman, construction engineer, L. N. Robinson, electrical engineer, W. L. Richardson, structural engineer, and the writer is general superintendent.

The Baker River Development

A Discussion of the Electrical Features

By L. N. Robinson

Electrical Engineer, Stone & Webster, Inc., Seattle

HYDROELECTRIC power supply in the Pacific Northwest is augmented to the extent of 39,000 kva. by the completion of the initial installation at the Baker River station of the Puget Sound Power & Light Company. Load growth throughout the company's system and particularly in the northern districts necessitated power development on the northern end of that system. Thus Baker River will carry the northern end of the system and relieve the southern generating plants of that burden and make available their power for the growing load in Seattle and environs. Further, power purchase from Canada will be discontinued upon the expiration of the present contract next April. Thus the advent of this additional power effects somewhat of a shift in the "center of gravity" of Northwest power.

The entire scope of the development includes the generating station, 66 miles of 110-kv. transmission line, 22 miles of 66-kv. transmission line, two major substations and, of course, the hydraulic development, which is described in another article.

Building and Equipment

Built of reinforced concrete, the power house is designed to house all of the electrical equipment with the exception of the lightning arresters, which are located upon the roof. The third and fourth floors of the building carry the heavy switching apparatus and hence they contain some structural steel beams. The present building is 154 ft. 6 in. long, 98 ft. wide and 87 ft. 4 in. high from the basement floor to the ridge of the roof. Complete provisions have been made to care for a 112 ft. 6 in. extension of the building to accommodate further generating capacity.

In the basement just in the rear of the water-wheel foundations are located the oil-pump rooms, oil-storage rooms, generator rheostat rooms, and neutral switch room. Generating units, exciters and transformer bays occupy the first floor. The second floor carries the main switchboard room, the office and the 6.6-kv. bus, while the third floor contains the battery room, 6.6-kv. switch room, two small instrument rooms, a storage room and locker room. The fourth floor is given over to 110-kv. buses, switches and instrument transformers. Twin housing structures on the roof cover the 110-kv. potential transformers and their fused disconnecting switches. Adjacent to these housings are the

THE Baker River development of the Puget Sound Power & Light Company is the outstanding power project of the year in the Pacific Northwest. A 40,000-kva. power house, two important substations and 66 miles of 110-kv. transmission line all are integral parts of this project. Its completion brings a new power source into a growing district.

lightning arrester racks and the steel structures from which the lines take off. A 75-ton Niles crane with a 10-ton auxiliary hook and 4-motor drive spans the generator room 35 ft. above the floor. The general arrangement of the building and its equipment is shown in Figs. 1 and 2.

Furnishing the motive power for each of the two generators are double-overhung, Allis-Chalmers, Francis-type, horizontal

turbines. Each wheel is rated at 10,000 mechanical horsepower when operating under an effective head of 200 ft. and at 300 r.p.m. Two of the interesting features of the double-overhung unit are the elimination of the shaft through the discharge elbows and the improved accessibility to the runners for inspection and repair purposes.

Each generating unit is equipped with an Allis-Chalmers oil-operated governor which is belt-driven from the horizontal shaft of the unit and controls both of the waterwheels of the unit. No relief valves are necessary because of the proximity of the surge chamber to the turbines.

Main Generators

The two G. E. generators are each rated at 19,500 kva., 15,600 kw., 0.8 power factor, 6.6 kv., 3 phase, 60 cycles, 24 poles, 300 r.p.m.

Turbine runners are bolted directly to hubs forged on each end of each generator shaft. Each complete rotating element, including generator rotor, shaft and two turbine runners, weighs 70 tons and is supported by two 17x34-in. water-cooled bearings. The bearings operate normally with ring oiling, but are provided with pressure oil supply for use during starting and stopping periods.

The rotor is equipped with an amortisseur winding and speed switches for use in automatic synchronizing. While the machine is coming up to speed the operator can turn a key on the switchboard which prearranges the switch-control circuits. Once this is done the generator oil switch automatically will connect the generator through its transformer bank to the system as soon as the speed reaches 95 per cent of normal. This is done with the field circuit of the generator open. The induction-motor effect of the squirrel-cage winding brings the unit nearly up to synchronous speed. The field switch is closed automatically a few seconds after the main oil circuit breaker closes and as the field builds up the generator is pulled into

synchronism. The operator then adjusts the field current for the voltage and power factor conditions desired.

In case a generator is thrown out of synchronism due to sudden interruption of its load and the speed rises above normal, the machine also may be re-synchronized automatically since the speed switch opens when the speed exceeds 105 per cent of

normal. The operator then adjusts the field current for the voltage and power factor conditions desired. These relays can be made to shut down the machine or to disconnect successive outgoing lines when the temperature reaches the limit. However, it hardly seems advisable to make use of these facilities in the case of the Baker River station, at least for the present.

Air required for cooling the generators amounts to 47,000 cu. ft. per min. per generator. This air is drawn through openings in the river wall of the building 17 ft. above the generator room floor line and down through ducts to the basement where it passes through a Sprayco air washer at the entrance to each generator pit. Air washers are deemed especially necessary at this plant because of the proximity of the large cement mill at Concrete, less than a mile away, and the consequently large amount of dust always in the air.

Since the generators are totally enclosed by the frames and end shields which cannot be removed instantaneously, each generator is fitted with perforated fire-extinguisher piping inside the end shields at both ends. This piping is connected to the station water supply through suitable valves and drains to prevent water entering the generators unless needed.

Exciters

Since the main generating units have the double-overhung turbines without shafts extending beyond the runners at either end, it is out of the question to employ direct-connected exciters for the individual units. Each of the main generating units requires 100 kw. of excitation. The station crane is operated with direct current supplied from the exciter buses. The high-pressure bearing-oil pump also is supplied from the exciter buses so that the main generating units can be started up without the aid of any source of electric power outside the station itself.

Two 500-kw., 250-volt, compound, interpole, horizontal Westinghouse exciter units are installed to operate at 875 r.p.m. Each exciter is large enough to excite four 19,500-kva. main generating units and to handle the station crane and high-pressure oil pump in addition.

Each exciter is coupled to a 750-hp., 6.6-kv. squirrel-cage induction motor. One unit also is equipped with a 720-hp. Francis-type turbine which may be used instead of the motor when desired. The shaft of the other exciter is suitable for connecting a similar turbine in the future if desired. The water-wheel drive will be used normally.

Main Transformers

Each of the two main transformer banks consists of three General Electric 6,667-kva., 6.6/63.5-110 kv. (Y), oil-insulated, water-cooled transformers. The transformers are connected delta on the low-voltage side and star on the high-voltage side. It is planned to operate with the neutrals grounded on the high-voltage side.

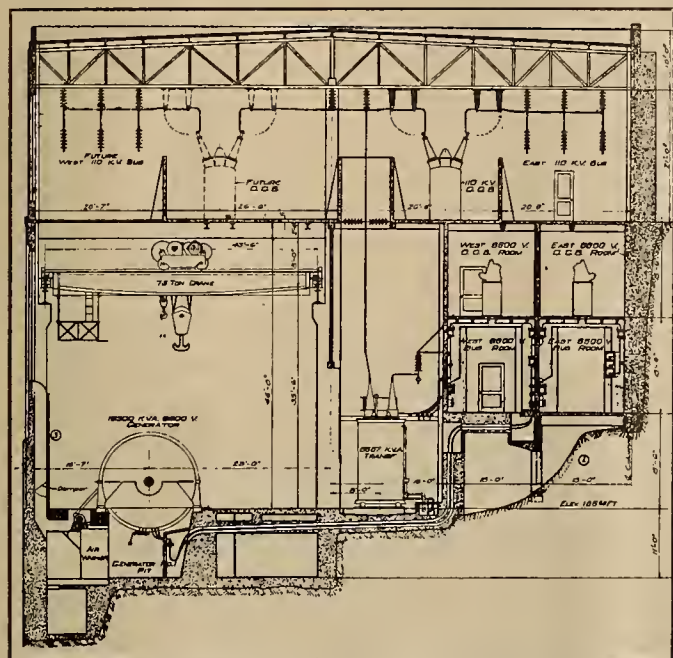


Fig. 1. Transverse section through main generator and 110-kv. transformer indicating the course of the electric circuits from the generator to the high-tension bus.

normal. By turning the automatic synchronizing key the operator can arrange for the machine to be synchronized automatically as soon as the speed comes down to within 5 per cent of normal. It is expected that these automatic features will expedite considerably the resumption of service after interruption, as well as reduce the number of attendants required.

This system of synchronizing has been used extensively in connection with the operation of automatic stations, but there is no record of cases where it has been used in synchronizing units as large as the Baker River units, nor units comprising so large a percentage of the total generating capacity of a system.

Leads from both ends of the stator winding are brought out of the stator frame to accommodate the introduction of current transformers for differential protection of the generators before making up the generator neutral. Each generator is grounded through a non-automatic oil circuit breaker. In case of a short circuit or ground in the generator or in its main cables the differential relays automatically disconnect the generator from its load, open the generator field switch, shut down the turbine and sound the station alarm.

Temperature coils are embedded in the slots against the insulation of the main coils of each generator. The temperature indicating instruments are mounted on the switchboard. Temperature re-

The transformers are equipped with $4\frac{1}{2}$ per cent over-voltage taps on the high-voltage side to compensate for internal voltage drop, particularly when operating with low-power-factor load. This is done so that normal voltage can be maintained on the high-tension bus without seriously over-exciting the generators. Since the transformers are furnished with oil conservators they also are equipped with

provided on each of the transformers. Differential relays open the oil circuit breakers on both the high-tension and low-tension sides in case of trouble inside the transformers. These relays function in response to unbalances in the current in the respective phases on the two sides of a transformer bank.

The transformers are provided with flanged wheels on standard railroad track gage of $56\frac{1}{2}$ in. This happens to be especially useful since the short private railroad to the power house passes under a highway bridge with a clearance that did not permit taking the transformers through on even the lowest type of flat car. The transformers were taken down this track on their own wheels with the help of a locomotive crane.

Fig. 3 shows the general arrangement of apparatus on the first floor.

Bus Arrangement and Switching Equipment

A single 6.6-kv. bus can be fed from either or both of the main generating units. Normally this bus will be used principally to supply the station service transformers and the exciter motors. The main output of the generators will go directly to their respective transformer banks without passing through the low-tension bus. The bus will be of adequate capacity, however, so that the output of either generator can be transferred to either transformer bank in case of emergency. Future generators probably will not be connected to this bus. As indicated in Figs. 1 and 2 the 6.6-kv. bus is back of the transformers on the second floor. This location reduced the amount of excavation necessary and also aided in making full use of the building height required for crane and high-tension clearances.

The ultimate development of the station contemplates two 110-kv. buses. Only the necessary part of the first of these and the connections for the bypass air-break switch are installed at present. Reference to Fig. 5 will show the scheme of electrical connections including the substations.

The main generator oil circuit breakers are of General Electric manufacture and have 2,000 amp. continuous carrying capacity and a 100,000-amp., 5-sec. carrying capacity. Each has a guaranteed

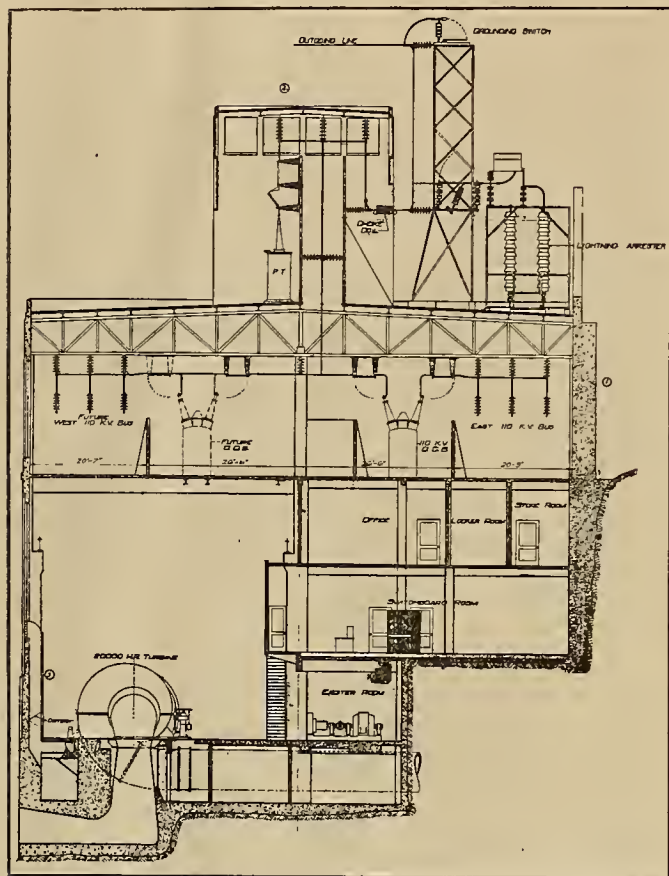


Fig. 2. Transverse section through exciter room and outgoing line position indicating the electrical circuits from the high-tension bus to the outside line.

ratio adjusters so that taps may be changed without breaking the oil-tight joints at the manholes on the top of the transformer tanks.

Temperature coils embedded in the windings operate indicating instruments on the main switchboard. A thermometer with alarm contacts also is

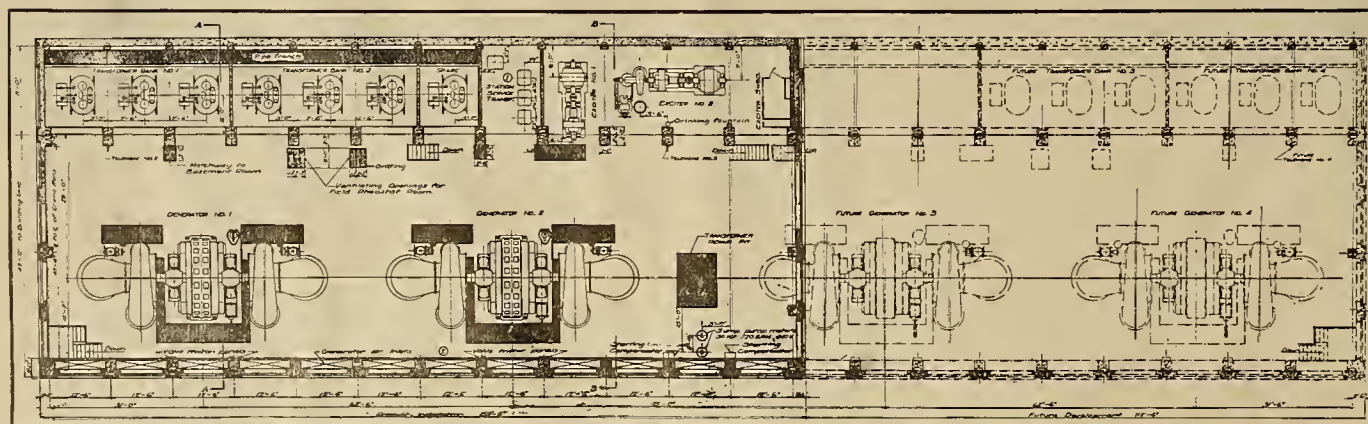
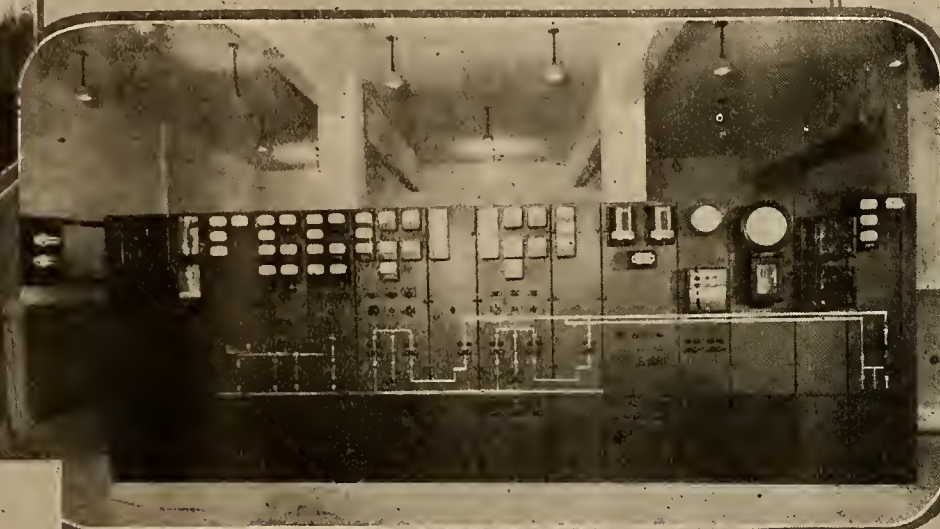


Fig. 3. Generator floor plan. This shows the relative positions of generators, transformers and exciters and indicates the contemplated future addition to the power house.



2



4



5

ELECTRICAL features at Baker River are interesting in the light of ordinary present-day practice. Two-pole H-frame towers carry the 110-kv. transmission line (1). The two generating units (2) are double-overhung horizontal units with reaction wheels. On the main switchboard (4) is an annunciator which indicates to the operator all relay operations. Typical low-tension switching equipment is shown (3) and also the high-tension bus and switch layout (5); all indoors.

rupturing capacity of 52,000 amp. at 6.6 kv. based on the OCO plus OCO duty cycle. The oil circuit breakers for the 6.6-kv. station service and exciter motor circuits have a 1,200-amp. continuous carrying capacity and a guaranteed rupturing capacity of 52,000 amp. at 6.6-kv. Normal loads on the latter circuit breakers will not exceed 100 amp., but it was necessary to purchase 1,200-amp. breakers in order to obtain the necessary 5-sec. and 1-sec. carrying capacities, namely 60,000 and 100,000 amp., respectively.

The 110-kv. oil circuit breakers for the transformer banks and transmission line have a 400-amp. continuous carrying capacity and guaranteed rupturing capacity of 5,500 amp. at 110-kv. with 5-sec. and 1-sec. carrying capacities of 20,000 and 40,000 amp., respectively. The net weight of each of these breakers complete with oil is 52,400 lb.

Station Service Transformers

Station power service is supplied from a bank of three Westinghouse 200-kva., self-cooled transformers stepping down from 6.6 kv. to 440 volts, 3 phase. These supply the auxiliary motors in the station, headgate motors, shop equipment and general power requirements except the crane motors and bearing-oil pumps.

For lighting the station a similar 200-kva. transformer will be installed to step down from 6.6 kv. to 110/220 volts, single phase. It is not expected that the station lighting load will approach 200 kw., but interchangeability between the station light and station power units is desirable in case of breakdown in any one of the units. Since the station power transformers will be connected delta-delta, one of them can be used to replace the station lighting transformer if that should fail, leaving the power bank operating open-delta temporarily.

Miscellaneous Apparatus

A 60-cell Exide battery is installed for supplying the oil-switch control circuits. This battery also supplies emergency lights in the station to provide illumination in case of failure of the alternating current. The storage battery is charged by an induction-motor-driven charging set floated across the battery at all times except during interruption of the a.c. supply.

Two Westinghouse vibrating-relay-type voltage regulators are installed for automatically regulating the voltage of the main generators. One of these is connected to each of the 500-kw. exciters. Since the estimated range of exciter voltage is from 60 to 250 volts, the regulators will be energized from the storage battery. The regulators are mounted on the main board in the control room which overlooks the generator floor.

Three separate switchboards are installed. The main switchboard is in the switchboard room on the second floor. This switchboard controls the 6.6-kv. and 110-kv. circuits and the exciters. The switchboard is of the straight, vertical-panel type with the indicating instruments and control switches on the front panels and the watt-hour meters and relays on slate panels in the rear. This leaves the

usual wiring alley between the two boards. The relay equipment is General Electric, and all indicating instruments are Weston. One of the features of the switchboard is an annunciator on a central panel opposite the operator's desk. This annunciator shows every relay operation and indicates the nature of the trouble causing the operation. The station clock on the switchboard is provided with a Warren synchronous-motor attachment for use in regulating frequency.

The station service switchboard is located in one end of the main switchboard room and at right angles to the main switchboard. This board contains a 440-volt, 3-phase station power panel; 110-220-volt station lighting panel and the storage-battery panel. The generator field control and exciter switchboard is on the first floor near the exciters and is remotely controlled from the main switchboard.

Transmission Lines

The 110-kv. transmission line consists of three No. 4/0, 7-strand, hard-drawn copper conductors supported by Locke suspension insulators on wooden

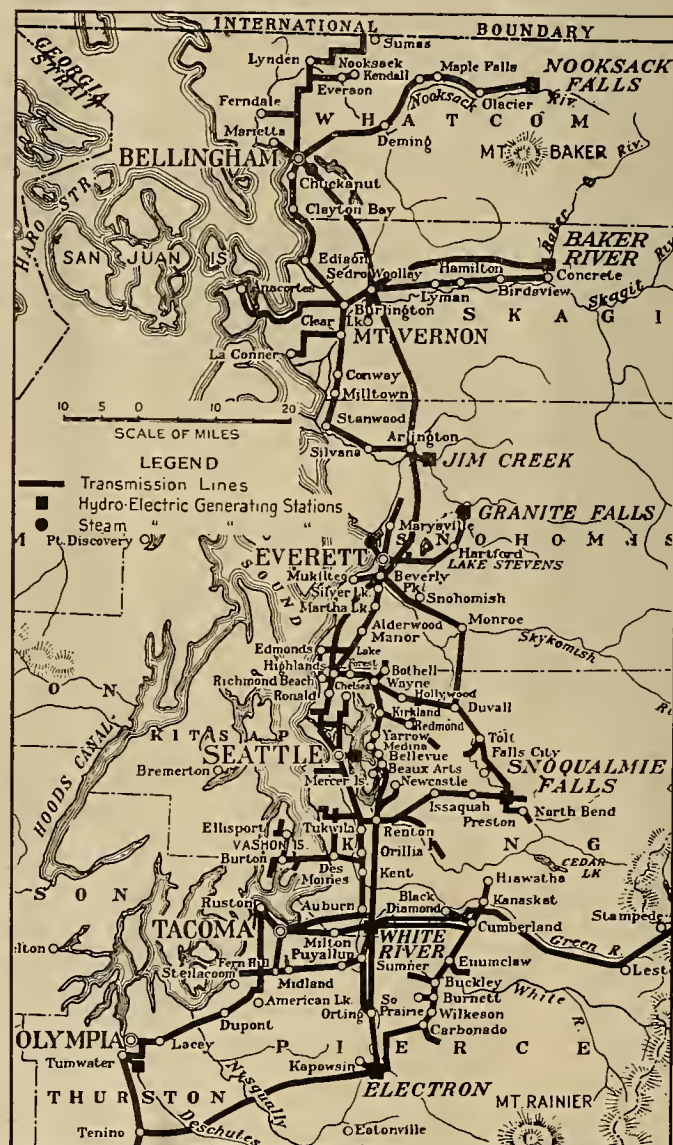


Fig. 4. Map of major portion of the transmission system of the Puget Sound Power & Light Company showing the location of the Baker River station with respect to the rest of the system.

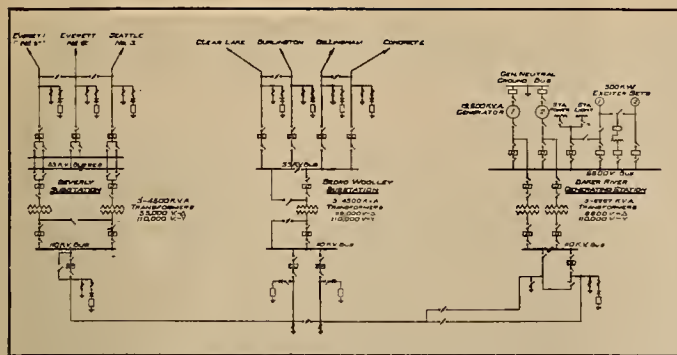


Fig. 5. Single-line wiring diagram of the initial installation at Baker River station, Sedro-Woolley substation and Beverly Park substation.

H-frame towers. The spans average 450 ft. in length and the conductors are strung on 11-ft. 6-in. centers. Steel towers are used only for crossing the Skagit and Snohomish Rivers. The length of the line from Baker River station to Sedro-Woolley substation is approximately 23 miles and from Sedro-Woolley substation to Beverly substation 43 miles.

From Sedro-Woolley a new 55-kv. line furnishes additional service to Bellingham. This line consists of three No. 4/0 stranded-copper conductors arranged in an equilateral triangle with 7-ft. spacings and carried on "Pinco" pin-type insulators. Wooden poles are used throughout the 22 miles of line with spans averaging 300 ft. in length.

Substations

Both the Sedro-Woolley and the Beverly substation are of the outdoor type with only the switchboards and auxiliaries installed in the respective buildings. These buildings are of reinforced concrete, each two stories high.

At both of these substations the switchboards are on the second floor so that the operators may have a clear view overlooking all of the outdoor equipment. The storage batteries, charging sets, shops, storerooms and miscellaneous auxiliaries are on the ground floor. The Sedro-Woolley building has incorporated in it a tower with a crane for use in untanking transformers. Trucks with heavy loads also can be driven directly into this building and unloaded.

Since the Beverly substation building later on will be extended to house synchronous condensers and then will be equipped with a traveling crane, a temporary steel tower with electric hoist has been erected outdoors. This tower spans the railroad spur which connects with the Pacific Northwest Traction Company. Thus the crane was available for unloading cars during construction. Transformers also can be rolled under it for untanking.

Outdoor equipment at each substation is supported on reinforced concrete slabs. Latticed structural steel columns and trusses support the wiring and the disconnecting switches. To obtain proper mechanical strength and rigidity as well as conductivity, the buses are all of 1-in. iron pipe size copper tubing. The bus conductors are carried on Locke suspension insulator strings and pedestal-

type insulators with as few dead-end strain spans as are practicable.

The 110-kv. line from Baker River goes right across the rear of the Sedro-Woolley station property. The line is double dead-ended at a structure on the property and looped through the station bus. A Pacific Electric air-break, pole-top switch mounted on the dead-end structure makes possible the complete by-passing of this station. An oil switch in each side controls the two branches of the line when it is looped through the station. The line terminates at the Beverly substation bus.



Fig. 6. Baker 110-kv. line crossing Snohomish River.

Unique Features

The outstanding feature of the power-house end of this project is the long list of factors which made the power site so nearly ideal and which tended to facilitate its economical development. Some of the more prominent of these factors are:

1. Glacial water supply supplementing heavy rainfall.
2. Reservoir site totally enclosed except at inlet and at outlet.
3. Dam site in narrow rock-walled gorge.
4. Tunnel only long enough to remove station from dam.
5. Tunnel through tight rock.
6. Cement mill less than mile from building site.
7. Gravel pit in lower end of reservoir site.
8. Concrete warehouses of abandoned mill on the property.
9. Common-carrier railroad a half mile from the power station.
10. Incorporated town across river from project.
11. Paved state highway through workings.
12. Less than twenty-five miles to tidewater.
13. Potential markets for power all along transmission line.



High-intensity illumination is used in these windows of a California power company.

High-Intensity Illumination of Power Company's Windows

THE last word in show-window lighting of high intensity and variety of color, spot lighting and foot lighting is now on exhibition day and night at the office of the San Francisco Division of the Pacific Gas and Electric Company. Here the public may see how electrical illumination can be made to compete with daylight.

Commenting upon this installation and its purpose one of the executives of the San Francisco Division of the company stated: "To demonstrate and reveal to all retail merchants and their customers the dollar-and-cents value of properly utilizing, controlling and directing the illumination in their show windows and stores, the company recently has completed the most modern installation of window lighting anywhere in the country west of Chicago."

These two windows are dedicated to and are offered for use to the customers of the company as an added opportunity to display merchandise sold in their own place of business, and to permit the merchant to see his own merchandise properly illuminated and displayed. In this way the merchant may realize fully the positive ability of light to create sales appeal, and to see what correct illumination can do.

An astounding advance in a knowledge of the science of illumination for every possible purpose has been accomplished by illuminating engineers in the last ten years. It is said that ninety per cent of retail sales are completed through vision. It becomes necessary then that merchandise should be shown properly illuminated to aid vision.

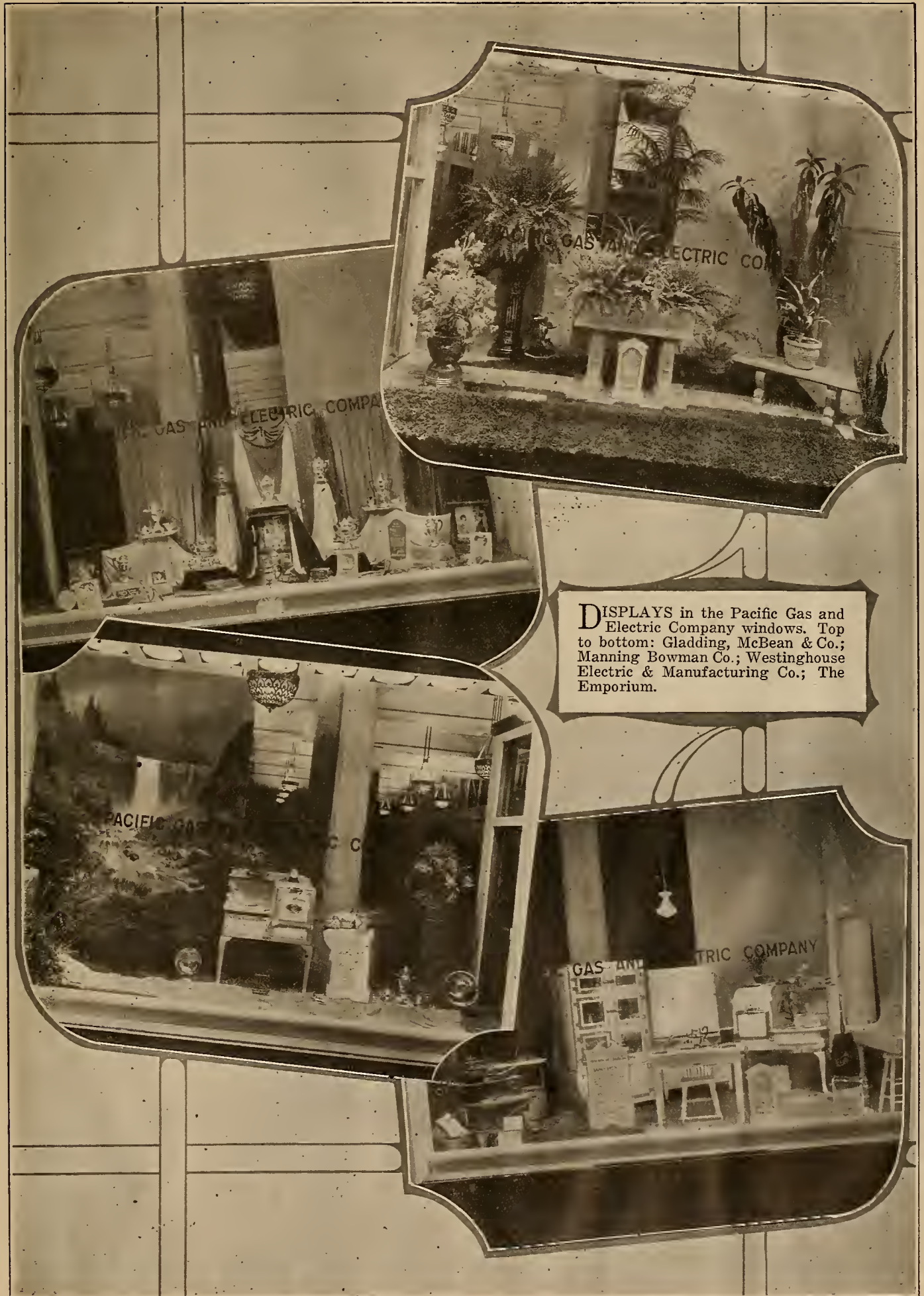
Correct and proper illumination for show-window and store lighting accomplishes the following desirable conditions:

1. Adds attractiveness and value to merchandise displayed.
2. Permits closer and more accurate inspection of goods, thereby reducing the number of exchanges.
3. Saves rent for the store in the middle of the block by enabling it to compete with the corner store without having to change its location.
4. Attracts trade from the poorly lighted store.
5. Creates a silent salesman after closing hours by serving "window shoppers."
6. Overcomes daylight reflections.

The overcoming of daylight reflections in display windows has long been a problem to store managers and illuminating engineers. It has been found that the more intense the light distributed properly on the display both day and night, the less will be the reflections in the plate glass windows. People on the streets in the daytime are shopping, and that is the time to draw them into a store.

Overcoming reflection was accomplished in this installation by the use of 500-watt lamps on 18-in. centers in X-Ray reflectors and housing mounted on the transom bar at the top of the windows, 500-watt X-Ray floodlighting units with color mediums installed in the corners and in the ceiling in each of the windows, and X-Ray disappearing footlights with 100-watt lamps on 6-in. centers. Alternate lamps in the main battery of lamps and also in the footlights are placed on alternate circuits; and each spot-light is controlled separately. The detailed electrical layout is shown in the accompanying diagram. The windows also are equipped with water, gas, compressed air, and drainage connections.

The first display to be placed in the larger window was made by the Westinghouse Electric &



Manufacturing Company. An oil painting 8 ft. wide and 11 ft. high of a mountain scene formed a beautiful background for the display. A little to one side in front of this was an illuminated picture of a hydroelectric power plant. In the center of the rest of the display was an all-white enamel Westinghouse electric range. In addition to this there was a number of smaller appliances shown, including an electric toaster, coffee urn, iron, and small air heaters. The attention of the onlooker was drawn to the various appliances by high-intensity "spotlighting" illumination, color effects, and distribution of light.

Table I. Window Checks on Various Stores on Sutter Street in the vicinity of the Pacific Gas and Electric Company. Afternoon: Weather Clear and Warm.

Store Display	Time	Passed	Stopped	Perct'g Stopped
1. Furniture	3:10 to 3:20	137	19	13.9
2. P. G. E. (1) El. Kitchen	3:45 to 3:55	139	52	37.4
3. P. G. E. (2) Chocolates	3:45 to 4:05	105	33	31.4
4. Pack Drugs	4:08 to 4:18	151	9	6.0
5. Toilet Art., Ftn. Pens.	4:22 to 4:32	123	5	4.1
6. Elect. Ranges	4:34 to 4:44	131	3	2.3
7. Gas Ranges	4:34 to 4:44	131	3	2.3

The westerly window was equally attractive and beautiful. Gladding, McBean & Company created the display in this window, which consisted of gar-

these windows to enable them to ascertain in a practical way the value of proper illumination. Some interesting checks already have been made on passersby that prove conclusively the value of high-intensity illumination. The first of these was made on a Saturday afternoon between 2:30 and 3:00 p.m. During this half hour 123 people passed the window; of this number 79 or 64.2 per cent, stopped to look in one or both of the windows. Tables I and II show the results of additional checks on these windows and also on windows of other merchants on the same street.

Table II. Window Checks on Various Stores on Sutter Street in the vicinity of the Pacific Gas and Electric Company. Morning: Weather Clear and Warm.

Store Display	Time	Passed	Stopped	Perct'g Stopped
1. Furniture	9:55 to 10:05	80	1	1.3
Furniture	11:28 to 11:38	137	12	8.8
2. P. G. E. (1) El. Kitchen	10:41 to 10:51	137	33	24.1
3. P. G. E. (2) Chocolates	10:31 to 10:41	127	25	19.7
4. Pack Drugs	11:05 to 11:15	147	0	0.0
5. Toilet Art., Ftn. Pens.	11:16 to 11:26	75	2	2.7
6. Elect. Ranges	10:17 to 10:27	133	3	2.3
7. Gas Ranges	10:17 to 10:27	133	3	2.3
8. Elec. Goods	10:52 to 11:02	134	1	0.7
9. Ladies' Wear	9:55 to 10:05	144	14	9.7
10. Furniture	9:55 to 10:05	70	17	24.3
11. Candies	10:23 to 10:33	79	23	29.1
12. Ladies' Wear	10:10 to 10:20	93	21	22.6
13. Furniture	10:38 to 10:48	52	6	11.5
14. Market	10:51 to 11:01	84	5	6.0
15. Picture Frame	11:10 to 11:20	39	1	2.6
16. Hats and Dresses	11:10 to 11:20	77	19	24.7
17. Furniture	11:26 to 11:36	48	3	6.3

The windows already have produced splendid results. Representatives of two large concerns with their architects have called on the power-company officials to go over the details of the installation in order to plan similar installations correctly.

Pumping Crude Petroleum by Electricity

By C. R. Powell
Westinghouse Electric & Manufacturing Company

WHEN electric equipment first was used for pumping oil wells there was a tendency to use existing standard motors and controllers, little consideration being given to the actual conditions under which the apparatus would have to operate. Consequently, some of the operations in connection with sufficient satisfaction to effect an appreciable movement toward the general use of electricity in this work. This led to a detailed study of the actual requirements and to a succession of developments all leading toward perfection in the design of an oil well pumping motor and its controller.

A well producing crude petroleum has a variety of power requirements. The actual pumping duty is light or moderate at fairly low speeds. The cleaning and pulling operations are heavier duties, most economically performed at considerably higher speeds. Power also is required occasionally for short periods of time for pulling casing.

Since the power requirements for a producing well as mentioned above vary so greatly, a standard motor is not satisfactory. In some cases the pumping motor is of one size and is connected permanently to the pump on the well. When additional

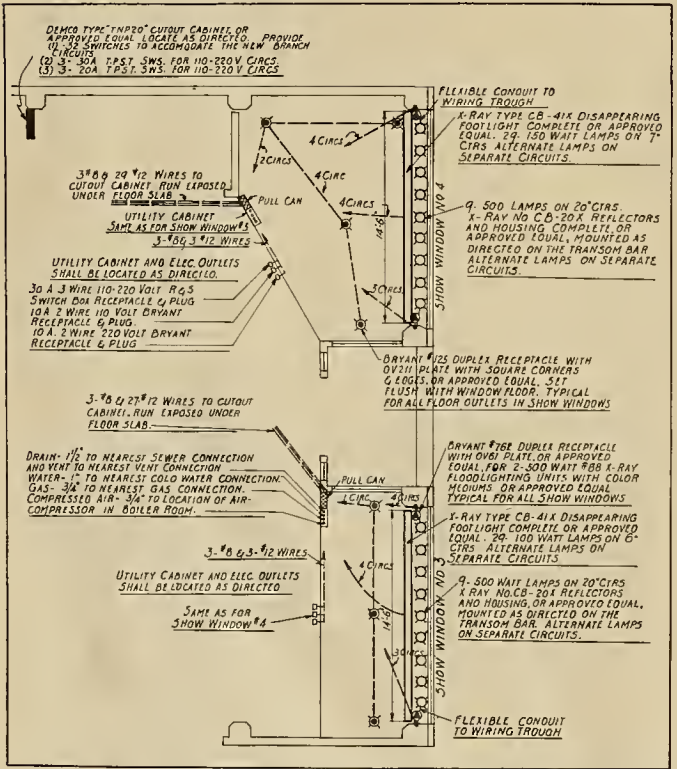


Fig. 1. Floor plan showing window lighting layout specified for the Pacific Gas and Electric Company.

den furniture of glazed and unglazed pottery as a series of settings for an extensive showing of foliage of different sizes, colors and forms.

During Diamond Jubilee week in San Francisco The Emporium put in a display showing a contrast between the kitchen of 1850 and that of 1925 with its electric range, water heater, air heaters, refrigerator, and the other modern electrical conveniences.

Other customers of the Pacific Gas and Electric Company will have an opportunity to make use of

power is required for cleaning and baling the well a larger motor must be installed for this duty. This method is uneconomical as it requires the use of two motors, and to secure a more economical unit the double-rated motor was designed for this work.

This motor can operate at two different speeds. At the low speed the horsepower is low since pumping is performed at the low speed; on the high speed rating the motor has a high horsepower capacity, which is used for the pulling and cleaning operations. High efficiency and economy thus are obtained on each of these operations, which differ widely in scope.

An important auxiliary of the double-rated motor is a special controller to obtain the different speeds and horsepowers. This control unit is unique in that when it is delivered at the well only a few simple connections need be made to the motor in order to place it in service. All complicated connections are made at the factory, leaving only a few simple final connections which can be made by even the most inexperienced electrician.

In pumping shallow, moderately deep, and light producing wells the unit pumping power has been found entirely satisfactory. In locations where the surface area is valuable, such as in towns, cultivated fields, and in isolated or inaccessible locations, such as river beds, it is particularly adaptable. Under such conditions the motor-driven unit is the cheapest and safest means of pumping because of its low first cost, low operating and maintenance cost, and absence of fire risk.

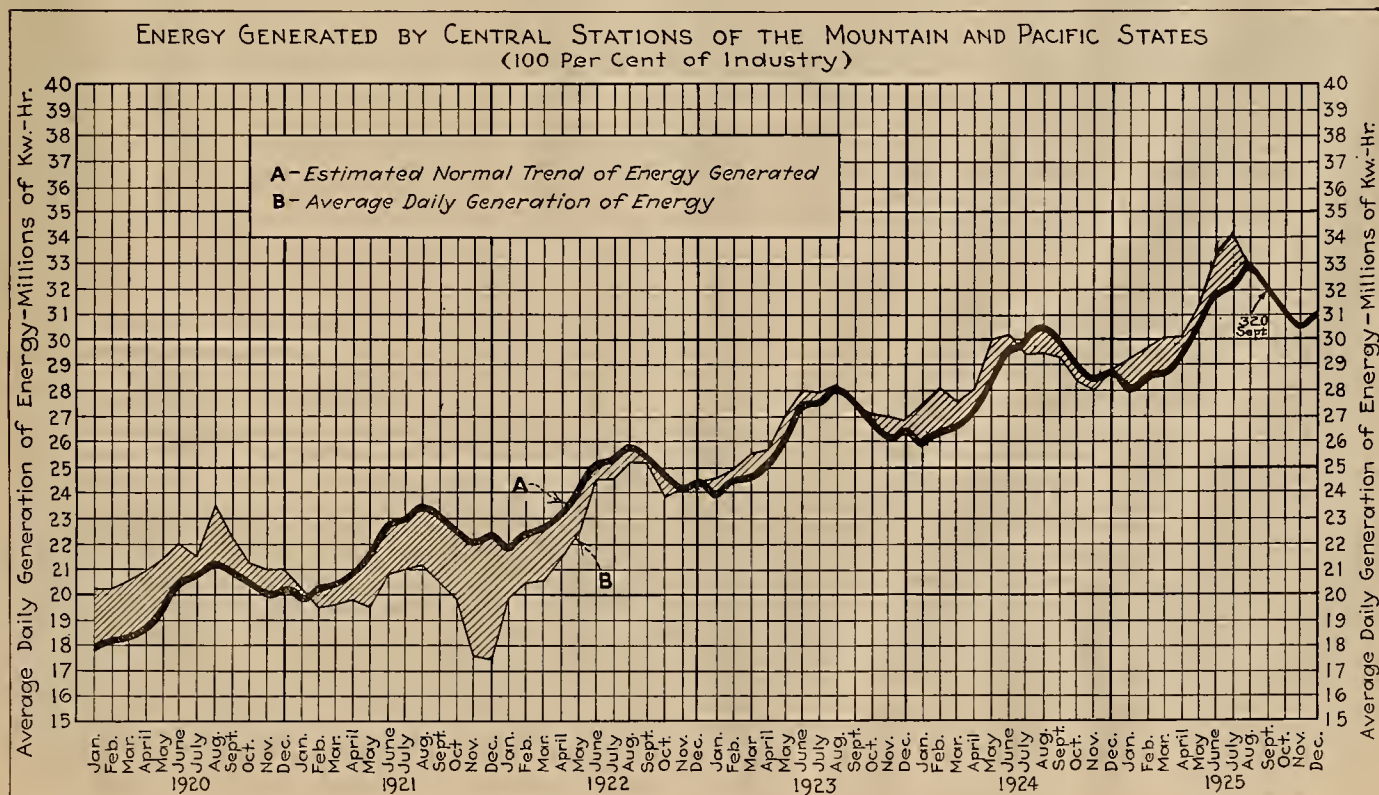
The operation of pumping jacks by means of pull rods from a central power head has been practiced to a large extent in some parts of the United States. The electric motor is especially suitable for driving these power heads. Minimum production cost is ob-

tained, and one man can take care of many wells. The upkeep and operating costs are low, in many cases negligible, and the wide range of motor sizes available makes it possible to obtain the most efficient equipment for any installation, regardless of the number of wells to be pumped.

Industry Operating at Normal in September

FOR the first time this year the central-station industry in the West reported operations at the estimated normal during the month of September. The output for the month was 941,618,000 kw-hr., or at the average daily rate of 31,990,000 kw-hr., which is the normal average daily rate of generation for September based on the operations of the industry in this section of the country during the past five years. The industry in this section has been operating at several per cent above the estimated normal since the opening of the year, in spite of the fact that the past five years have witnessed a marvelous development of the industry throughout the West. The total September output of the industry in the country as a whole was 5,020,756,000 kw-hr., or 2.4 per cent above the normal for the month based on the operations of the industry for the past five years. There is every reason to believe that the industry in the country as a whole will continue to operate above the estimated normal for the remainder of the year.

It must be remembered that all these figures are for the electric light and power industry only, and do not include energy generated by purely electric railway companies, Reclamation Service plants, or private industrial generating plants.



time throughout the day and if the lines sound unusually quiet or unusually noisy to investigate at once. If investigation shows local apparatus to be clear and in operating condition, the operator is instructed to open the line and endeavor to determine which portion of line is in trouble. The dispatcher then is notified of the findings. If the operator cannot determine which way the trouble is from his station, the dispatcher also is so notified. Also, if the substation operator does not hear any bells on his telephone for some time (depending on the use made of that particular line) he must "listen in" and, if the line sounds all right, call some station or the dispatcher and ask them to "give him a bell" for test to make sure that he has no trouble.

As a further check all substation operators are required to call some designated substation between 7:30 and 8:00 a.m. and at corresponding hours in the evening to report the condition of their telephone lines and apparatus in general. The operators at these designated substations, after hearing from all other substations in their districts, in turn report to the dispatcher over the telephone and also make written reports on forms as shown in Fig. 12, which are mailed to the superintendent of communication. Any trouble reported to the dispatcher in turn is reported by him to the communication department. All power houses report directly to the dispatcher except in isolated cases. From these written reports or forms it is easy to determine how much time a line has been out of service and whether there is a prevailing case of trouble that appears only at intervals and needs prompt attention.

In order to reduce the transmission and ringing losses as much as possible it is advisable to provide against the substation operator having more than one bell on the line at any one time, and also against his having his own bell on the line when he is talking or ringing. This is cared for by a switchboard as shown in Fig. 13. The electrical circuits of this board are shown in Fig. 14. It may be noted that only two lines are provided from the substation to the operator's cottage. This may have to be changed in rare cases, but it seldom should be necessary. When there is a line in trouble there is someone out to locate and fix the trouble, and the operator should be close to his station building to help with any necessary testing.

Editor's Note: This is the first half of the second of Mr. Kalb's articles. The second half will appear in the next issue.

Insulator Testing Aided by Johnson Buzz Stick

Insulator testing on The Washington Water Power Company's transmission line from Post Falls to Cataldo recently was completed successfully with the help of a Johnson "buzz stick." This work was done by a crew of four men who reported satisfaction at the method of doing the job.

The device used is for the purpose of locating defective insulators on transmission lines without taking the line out of service for the tests. It consists merely of a bamboo pole equipped with a small metal antenna and a small spark gap. The latter is adjustable by means of a cord.

The method of using the stick is to first touch it to the line to assure that the line is energized, as shown in the



Testing each petticoat of the insulator after the gap has been set by preliminary check on line wire.



Preliminary test on the line wire to see that line is energized and to set spark gap on "buzz stick."

accompanying illustrations. At the same time the spark gap is adjusted to secure a spark. Then the metal antenna is inserted into the various physical divisions of the insulator to be tested, and if a spark results it is indicative of poor insulation.

This device is expected to be put to extended use in the future.

Much controversy has arisen over the subject of the use of the "buzz-stick" and other similar forms of insulator testing apparatus. Several different devices have been brought out by as many different investigators but as yet patent rights are clouded.

Substation Layout Is Artistic Addition to Community

Setting the example for the many electrical homes to be found in Coronado, Calif., the San Diego Consolidated Gas & Electric Company has erected a group of buildings to house its local substation equipment and operator that are indeed a credit to the community. These are shown in the accompanying illustration. Every electrical convenience is provided for. Appearances further are enhanced through the notable absence of any overhead wires. Power is supplied to the station through two 3-phase, steel-armored, submarine cables from the mainland. All of the feeder circuits also are taken out underground.



A substation layout that would be a credit to any community, the Coronado substation of the San Diego Consolidated Gas & Electric Company. The sub itself appears in the right background, the operator's cottage in the foreground, and the shop and garage at the left.

IDEAS FOR THE CONTRACTOR

Electrical Advertising—Its Forms and Design—II General Sign Design and Several Types of Signs Are Discussed in This Article

By C. A. ATHERTON, National Lamp Works of General Electric Company

No matter what form of display is to be chosen, before a reasonable estimate of the illumination requirements can be made, a study should be conducted of the circulation, the possible observers of the display, and the district. This study should determine the following:

A. Legibility Area—The area of effectiveness, including the greatest distance at which the display must be effective, must be decided upon. Inasmuch as the size and cost of the display depend upon the effectiveness area that is finally determined upon, several estimates may be made and a comparison drawn between the advertising values and the operating costs of the various signs. To do this, a map should be drawn up showing all of the routes of traffic which command a view of the location and a number of circles sketched in, all of them passing through the location of the sign and including various percentages of the possible circulation. A study of the number of passers-by in the various circles of effectiveness and the costs of the respective signs will indicate the sign which gives the greatest advertising value per dollar of cost (initial and operating) and will furnish a firm basis of decision as to the proper size of the display.

B. Smoothness of Illumination—For exposed-lamp signs the shortest distance at which the display should be effective must also be decided upon. This is also often an indeterminate quantity, but again the cut-and-dry method may be used.

C. Necessary Sign Brightness—The district or competing brightness must be classified. The determination of this

classification is essential if the greatest advertising value per dollar of expenditure is to be had. It is also a somewhat indefinite quantity. It is arbitrarily assumed that localities may be divided up into districts according to their general brightness and the factor No. 1 is assigned to the brightest. The factor No. 10 is assigned to the darkest district, such as an isolated factory with a small exposed-lamp sign and only a few lighted windows. All other districts lie between these two and with a reasonable agreement may be estimated by anyone familiar with districts 1 and 10. This is illustrated in Table No. 1.

1. Exposed-Lamp Signs

With these general determinations made, the design of the several types of display proceeds as described in the following:

Approximate Rules for Simple Signs

The pattern in a correctly designed exposed-lamp sign consists of an apparently continuous line of light. It is actually made up of a series of spots of light corresponding to the individual light sources. The exact size of these spots may be accurately calculated (the method for doing this is described in Part II) or it may be assumed to be approximately proportional to the distance at which the sign is seen. From such an approximation there follows a set of simple equations which are sufficiently accurate for the design of most signs.

The first of these approximate equa-

tions, by which the letter size is determined, applies only to rectilinear letters, the proportions of which are about 3 in width to 5 in height. Frequently the dimensions of the sign are limited by the space available. The size of the smallest letter, however, should never be decided upon without first considering its relation to the greatest distance at which the sign should be effective.

When the following relationship exists, good advertising value for the sign under almost any possible conditions is practically assured so far as size of letters is concerned.

Letter Height for Good Advertising Value

$$H \text{ (in feet)} = \frac{D \text{ (in feet)}}{250}$$

in which H is the height of the letter measured from the topmost lamp to the bottommost lamp in a complete vertical stroke, and D is the greatest viewing distance.

Table No. 1—District Brightness Factor

Factor	Description of District
1	Extremely bright square.
2	Very bright centers.
3	Bright square in large cities.
4	White ways in large cities.
5	Public square in smaller cities.
6	Business districts (not white ways) in large cities—White ways in smaller cities.
7	Business districts in smaller cities.
8	Outlying districts in large cities.
9	Outlying districts in smaller cities.
10	Centers of small towns.
	Darker outlying districts with an occasional store, etc.
	Lighted highway but no stores.
	A small isolated display—no street lights or store windows.

Greatest viewing distance (D) is the diameter of the circle of effectiveness

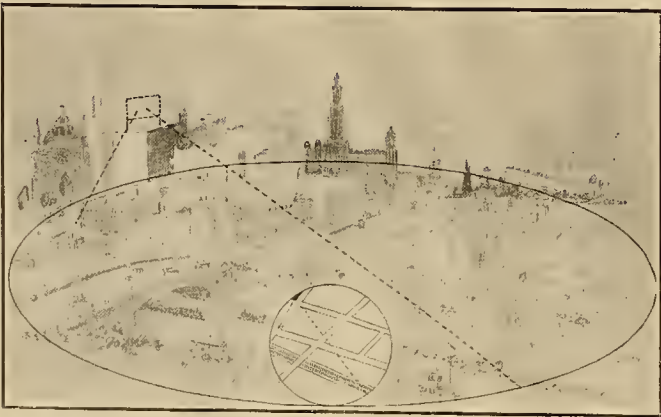


Fig. 8—The economical circle of effectiveness for the display first must be decided upon.

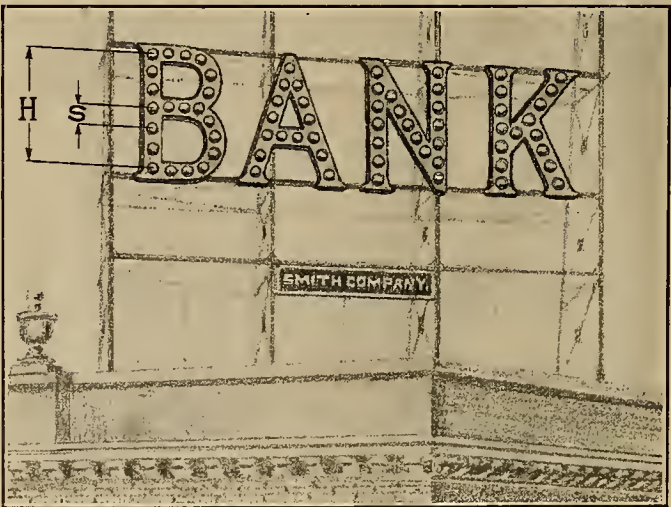


Fig. 9—Letter height (H) is a function of the greatest viewing distance. Lamp spacing (S) is a function of the shortest viewing distance.

or the greatest distance at which the details of the sign must be readily apparent.

This equation holds true for letters with a single line of lamps only.

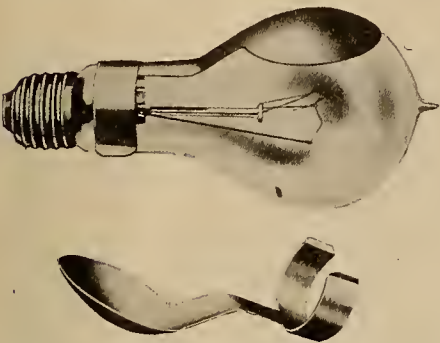


Fig. 10—Gas-filled lamps, burned horizontally in exposed-lamp signs, should be protected from rain, which so frequently causes breakage by sudden chilling. This metal cap prevents such breakage.

Frequently for one reason or another it is desirable to install a smaller sign in a given location. It will have a lower advertising value at a given distance but will still be legible to the majority of people until the following relationship is approached:

Letter Equation for Maximum Reading Distance

$$H \text{ (in feet)} = \frac{D \text{ (in feet)}}{500}$$

Signs should be designed with letters somewhere between these two values. Signs with letters smaller than is given by the second equation should never be used unless it is agreed that the legibility of the individual letters can be sacrificed.

In a few cases advertising value for a sign may be fairly high when the letters are made smaller than those given by the second equation. This is true when the shape of the sign is such that it will be recognized as a familiar trade mark at distances where the lettering is no longer legible or where the wording is so familiar to people that its general conformation is recognized without the need of deciphering all of the individual letters. Some signs have an effective advertising value at distances greater than those for which they are designed because of a persistent advertising program which has imprinted characteristic outlines or commanding location in the subconsciousness of the public.

The second problem of the sign engineer is the determination of the proper lamp spacing and the selection of the proper lamp.

Inasmuch as the lamp spacing depends upon the size of the spots of light and these depend upon the viewing distance, the lamp spacing is determined by the shortest viewing distance. The following approximate relationship should be used if it is required that the elements of the sign shall appear smooth and not spotted.

Lamp Spacing for Smooth Appearance

$$S \text{ (in feet)} = \frac{D' \text{ (in feet)}}{1000}$$

in which S is the distance between adjacent lamps, and D' is the shortest viewing distance.

A wider spacing is sometimes used to reduce the cost of the signs. This results in greater spottiness. The proper lamp spacing for a sign, the shortest viewing distance of which is less than 250 ft., would, according to the above equation, be less than 3 in. The lamps cannot be located on much less than 3-in. centers because of the size of the lamps.

The number of lamps in the sign now may be approximated as follows:

Number of Lamps—

Exposed-Lamp Signs

$$N = \frac{H}{S} \times \text{Number of letters} \times 2\frac{1}{2},$$

for the ratio of average letter outline to vertical stroke is $2\frac{1}{2}$.

The proper lamp size is determined primarily by the district brightness and secondarily by the maximum distance to which the sign must carry. The following equation which is based upon average atmospheric conditions in the various districts corresponding to the brightness factors involved will give

Table No. 2—Cubic Root Values for Use in Lamp-Size Equation									
Number	50	75	100	150	200	250	300		
Cube Root	3.7	4.2	4.6	5.3	5.8	6.3	6.7		
Number	400	500	600	700	800	900	1000		
Cube Root	7.4	7.9	8.4	8.9	9.3	9.7	10		
Number	1200	1500	2000	2500	3000	4000	5000 (1 mi.)		
Cube Root	10.6	11.4	12.6	13.6	14.4	15.9	17.1		
Number	7000		10000 (2 mi.)	15000		20000 (4 mi.)			
Cube Root	19.1		21.6	24.7		27.2			

the most suitable lamp size for all exposed-lamp displays. Select the standard lamp which comes nearest to the calculated figure from the following equation:

Lamp Size for Exposed-Lamp Signs

$$\text{Lamp Watts}^* = \frac{10 \times \sqrt[3]{D''} \text{ (in feet)}}{DBF}$$

in which D'' is the maximum distance and DBF is the district brightness factor.

(Example: The lamp watts for a sign located in a large city square with the district brightness factor, say 3, which must be effective up to a mile is equal to:

$$\frac{10 \sqrt[3]{5000}}{3} = \frac{10 \times 17.1}{3} = 57.$$

A 50-watt lamp is indicated.)

*This applies to clear lamps only. When blue glass bulbs (i.e., daylight) lamps are to be used, the next larger size will often be found to be desirable. When colors are used, either from a spray coating on the lamp or a color hood over it, a larger wattage is necessary to give the same brightness effect. The wattages in the table should be multiplied as follows when equal brightness is desired:

- For yellow light.....multiply wattage by 1.5
- For orange light.....multiply wattage by 2
- For amber light.....multiply wattage by 2
- For green light.....multiply wattage by 3
- For red light.....multiply wattage by 4
- For blue light.....multiply wattage by 15

Lamps larger than 100 watts should not be used; however the correct wattage per foot of line length as determined in this way should be maintained. This will often require two or more lamps in the place of one where color is to be employed. It should be noted that where color is used in exposed-lamp signs a lower brightness often suffices or is indeed to be preferred. Hence these wattage recommendations should not be taken as a general rule for all applications.

When the sockets are located less than 25 ft. from the ground, the display will have a better appearance if diffusing-bulb lamps are used.



Fig. 11—Enclosed-lamp signs are usually seen at comparatively short distances. Greater care should therefore be exercised to make their cases and mountings more artistic.

Gas-filled lamps when burned in a horizontal position and when exposed to the weather may be cracked by rain,

especially in sizes above 50 watts. They should be protected by a small tight-fitting metal cap on the bulb. This will greatly reduce the breakage.

2. Enclosed-Lamp Signs.

The effectiveness of an enclosed-lamp sign depends upon two characteristics. First, the sign may be given a pleasing daytime as well as night time



Fig. 12—The edges of most enclosed-lamp signs are ugly black troughs of wasted space. They should be decorated or used to carry additional messages.

appearance and second, the diffusing glass, when kept clean and properly illuminated, given the effect of smoothness, trimness, and dignity.

In order to capitalize the first char-

acteristic, that of good daytime appearance, these signs should be very carefully designed; greater effort should be used to make the metal case more artistic; it should be given a finer finish; and it should be made to harmonize with the building on which it is to be mounted.

For these signs in which extreme brightness and many motion effects are not possible, beauty and individuality are essential to effectiveness.

While the second characteristic, that of whiteness and smoothness of the illumination, is present in new signs, everyone has noted displays of this type where the letters are dull and lifeless and the illumination spotted as a result of failure to clean the letters and the inside of the box and to replace lamps. In many cases the construction has been such that it has been possible to replace lamps only with great difficulty and almost impossible for the maintenance man to clean the inside of the glass letters. In making or purchasing a sign of this type the construction should include hinges on at least one face. One application of this feature is illustrated in Fig. 16.

The chief problems for the preliminary estimate are first, to determine the size of the letters for a given range of legibility; second, to determine the proper spacing of the lamps for smooth illumination; and third, to determine the proper wattage of the lamps to furnish correct

brightness. The procedure given below applies only for signs with standard block letters.

The size of the letters depends upon the greatest distance at which they must be effective. This may be approximated as follows:

Letter Size for Enclosed-Lamp Signs

$$H \text{ (in feet)} = \frac{D \text{ (in feet)}}{300}$$

in which H is the height of the letter measured on the center lines of the top and bottom strokes of the letter, and D is the greatest viewing distance.

The lamps should be spaced so that the filament centers of no two adjacent lamps are more than 6 in. apart. (See Figs. 14-A and B. For illumination of large surfaces this requires lamps at the corners of equilateral triangles, 6 in. on a side, covering the pattern. For the illumination of a sign, in which the units (words, letters, or pictures) are made up of rectangles, the number of lamps per rectangle, equally spaced to cover it, equals the nearest even number larger than N in the following equation:

$$N = \frac{WH}{40}$$

in which W is the width and H is the height of the rectangle in inches.

(To be continued.)

Illumination System Installed Around Lake Merritt

Lighting Standard, Underground Cable and Method of Control of All Lights Are Features of This Installation

By ROMAINE W. MYERS, Consulting Electrical Engineer

The decorative illumination system installed around Lake Merritt in Oakland, Calif., includes 126 lighting standards with special Venetian lanterns spaced about 125 ft. apart along the lake shore in staggered formation. The lighting standards have exposed surfaces of copper and bronze fittings which will be allowed to take a natural weathered finish. They were manufactured in Oakland by the United Iron Works. Since the installation was made possible by popular subscription, each standard bears a bronze plate with the name of a subscriber. The lanterns are General Electric Company, form 19, large pendant type with a symmetric type dome refractor and holder, their exposed surfaces are of bronze alloy, acid-dipped. The dome refractors direct a large portion of the light upon the water so that the benefit of the reflection of the lake surface is secured. The lanterns have amber cathedral glass panels. Four-thousand-lumen 14.8-volt 15-amp. Mazda lamps are used in each one.

The system service is three phase, four wire, 4,000 volts. The lighting standards are supplied with two circuits from constant-current transformers, with a maximum voltage of 5,000. General Electric subway-type current transformers are placed at each standard, reducing the voltage at the lamp to 14.8.

Steel-taped armored cables were installed between each of the lighting standards and from them to the control station. Over 20,000 ft. of 5,000-

volt Parkway cable were used in making the installation, the majority of which was four and six conductor No. 8 solid with Okonite insulation. This cable was ordered, manufactured, inspected, tested by the Electrical Testing Laboratories for the consulting electrical engineer, shipped and delivered in fifty-five days to destination. Time was an important consideration in this job as it had to be entirely completed within 93 days in order to avoid a penalty of \$50 per day. The cable was installed in a trench 18 in. deep; this trench had to avoid trees and large roots.

The lighting standards are mounted on concrete bases containing an absolutely watertight chamber for the transformers.

Festival Lighting

Ample provisions have been made for special lighting arrangements for pageants and festivals. Each lighting standard is equipped with hooks for attaching multiple strings of lamps, and alternate standards have a Hubbell No. 5614 receptacle for connecting these lamps with the power supply.

At alternate lighting standards a special 2-kva. Kuhlman Electric Company subway-type transformer is installed to supply power for the festival lights. These transformers operate on a 6.6-amp., 5,000-volt, 60-cycle series circuit; secondary voltages vary from 105 volts at full load to 127½ volts at no load.

It is an innovation to produce series

transformers for operation on a multiple secondary of the capacity used. This provides a very flexible system eliminating the use of a great number of multiple transformers with their cut-outs and sub-feeders, thus controlling through two constant-current transformers all the multiple festival lights. It is proposed to illuminate a Christmas tree to be installed between each standard during the Christmas holidays, each tree to have fifty 10-watt 110-volt lamps. These lamps operate on a less wattage than the transformer capacity; the rise in voltage can be compensated for by the setting of the dimmer control apparatus.

Between the poles are concrete sockets for 21-ft. flagpoles which serve as central supports for the festoons. Each festoon contains 24 moulded weather-proof pendant sockets which are supplied with 40-watt, 110-volt Mazda lamps. These lamps were inserted in special cambric lanterns when the installation was dedicated on the opening night of the Dons of Peralta festival this fall.

Floodlights

Floodlights are installed in a number of places around the lake in order to illuminate some of the groups of trees and shrubs. Thirty-two Wheeler Reflector Company floodlights are used for this purpose. They are installed in a watertight concrete container as shown in Fig. 2. Two-kva. Kuhlman Electric Company subway-type transformers are installed at eight of the lighting standard bases to supply power for the floodlights. The transformers operate on a 6.6-amp. 5,000-volt series circuit and supply a secondary full-load voltage of 105 and 127½ volts at no load. Six hundred-volt two-conductor No. 8 steel armored cables are run from these transformers to the floodlights; this cable was laid in an 18-in. trench. Each floodlight is equipped with a 500-volt Mazda lamp.

Control Station

All of the lighting standards, festival lights, and floodlights are controlled from a central control station. The main switchboard, circuit breakers and current coils are of General Electric Company manufacture. One 35-kv. General Electric type R. V. 2,300-volt primary 60-cycle, 6.6-amp. and one 20-kw. General Electric type R. V. 2,300-volt primary constant current transformers are installed. On each of these there is installed a 1/8-hp. single-phase, 1,200-r.p.m. 110-volt 60-cycle motor and chain gearing connected to a magnetic clutch. A 7-in. Cutler-Hammer magnetic clutch which connects to an enclosed reduction gearing (approx. 4,800 to 1) is connected to the sector mechanism of these transformers. The movement of the magnetic clutch is so arranged that the normal current can be reduced in the transformer to a value that will bring the lamp filament to a dull red. The gears are such that the time limit of operation from normal current on full candlepower of lamps to dull red of the filament is one minute. When the solenoid of the constant-current transformer reaches either the low or high operating point the motor and magnetic clutch mechanism automatically disengages. This motor operates with a start, stop, and reverse push button controlling the reversing contactor and its mechanism. A 250-watt, 110-volt

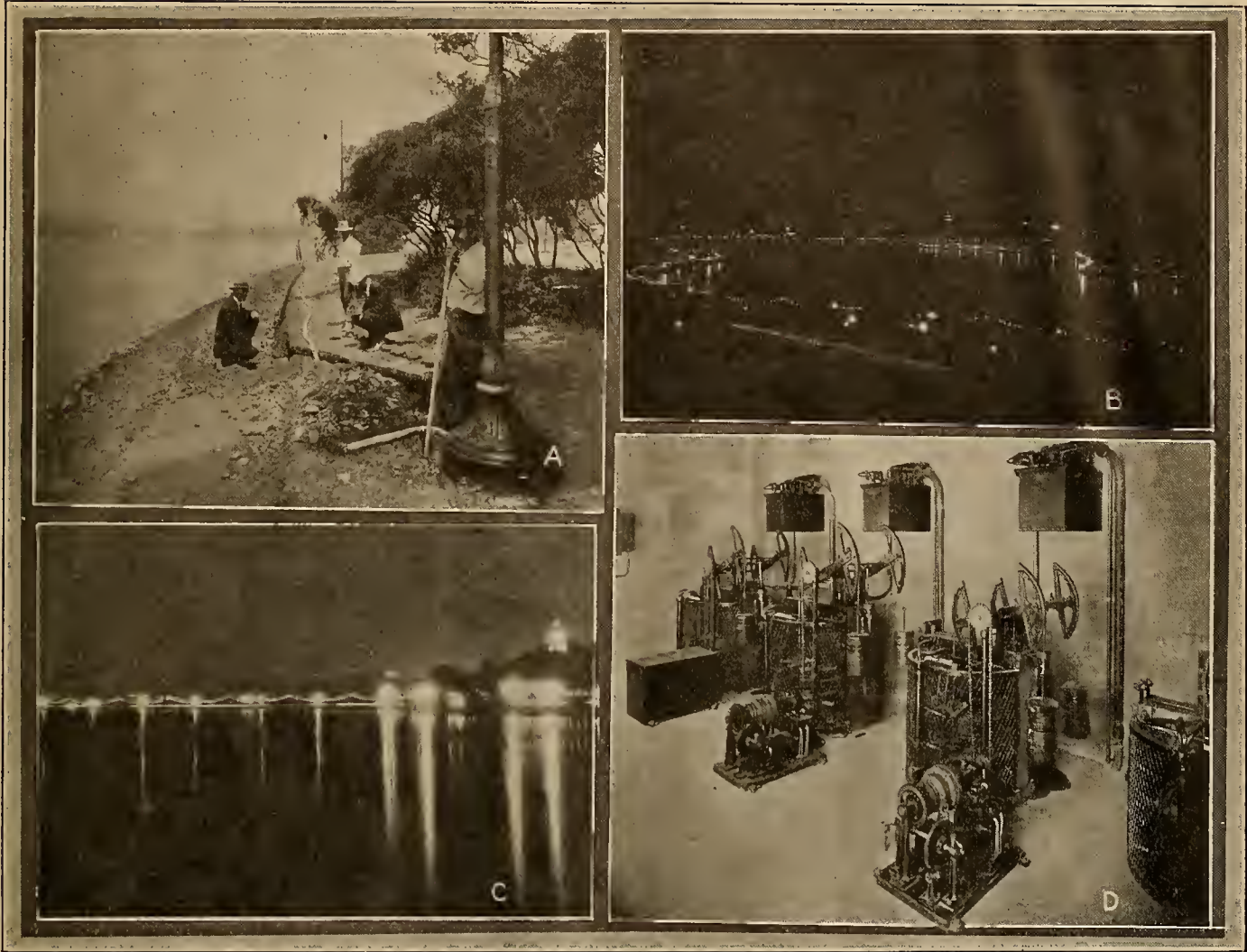


Fig. 1. Several views of the illumination system installed around Lake Merritt. A—Steel-taped armored cables being installed between standards in a trench 18 in. deep; this trench had to avoid trees and large roots. B—Night view showing practically the entire lake; the festoons of festival lights may be seen between the standards. C—Another night view showing the great amount of reflection secured from the lake surface. D—General view of the control room showing the magnetic clutch mechanism and other control equipment.

d.c., 110-volt a.c., single-phase, 60-cycle motor generator provides the direct current for operation of the magnetic clutch.

The writer designed the installation which was made by the Central Electric Company under the direct supervision of J. M. and D. M. Carlson.

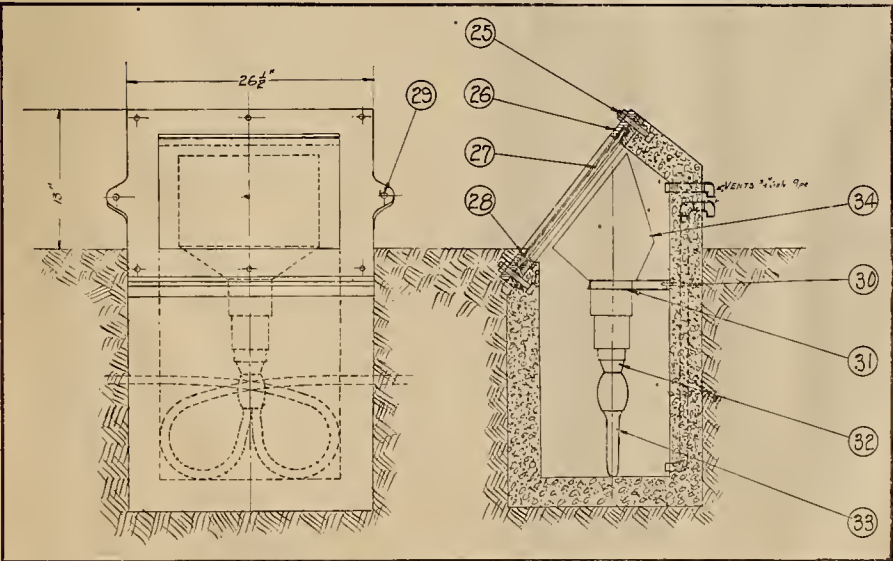


Fig. 2. Detail of one of the floodlights used to illuminate some of the groups of trees and shrubs. This is installed in a watertight concrete container. Legend: 25, bolts; 26, frame; 27, glass; 28, gasket; 29, padlock; 30, bolt; 31, clamp; 32, ferrule; 33, cable; 34, floodlight.



Fig. 3. One of the main lighting standards; these have exposed surfaces of copper and bronze fittings.

BETTER MERCHANDISING

Christmas Trees in Sidewalk Flagpole Sockets

Loveland, Colo., Uses City Street-Lighting Circuits to Light Trees in Business District of Town

The Christmas season, with its accompanying propensity towards varicolored and brilliant lighting effects in homes, night shopping in the stores and evening functions at churches, clubs and residences, is a pretty benevolent aid to the "juice" salesman. Yet, there are ways of helping a good thing along, as was demonstrated aptly last year at Loveland, Colo., by V. M. Johnson, commercial manager of the local Public Service Company of Colorado organization. Mr. Johnson turned a clever Yuletide idea into profitable business for his department and incidentally promoted an effective bit of holiday advertising in his home city.

In casting about for means by which he might exercise his business-getting talents, Mr. Johnson conceived the plan of using some permanent flag standards placed by the American Legion Post in front of practically every store on the principal downtown streets of the city. First he ordered a supply of uniformly sized evergreen trees from a mountain resident near Loveland. Then, armed with a contract form, he sallied forth and sold his idea to seventy-two merchants of the city.

As a result, each store participating in the plan was given a Christmas tree adorned with brightly colored electric globes. These were set in the flag standards and the decorative scheme properly carried out by attaching the temporary lamp circuit to the city's boulevard lighting system.

Through Mr. Johnson's originality and initiative, Loveland's business district presented an exceedingly attractive holiday picture at night, and the new business department of the Public Service Company showed a substantial increase in sales for the month of December. In addition, merchants profited because of the effective method of advertising and novel manner of promoting the Christmas spirit.

Will Start Finance Company to Aid Refrigerator Sales

Aiming to take full advantage of the great interest which has been aroused in the possibilities of electrical refrigeration for domestic use, the Southern California Edison Company has completed arrangements with several manufacturers of refrigerators that will permit of close co-operation between the Edison sales organization and the branch sales organizations of those companies.

Each of the thirty-one district offices of the Edison company will be a sales center for the spreading of the gospel of electrical refrigeration. It is planned to have on display in all offices one of the samples of the different makes selected, and a specialty salesman is to work out of each of these district offices.

An extensive advertising and sales campaign is to be launched which will serve to tie in in the public mind the idea of electrical refrigeration for the

home, the standard makes available, and the Southern California Edison Company. Plans called for the opening gun to be fired in the newspaper campaign Dec. 1, 1925, to be followed by a concentrated effort after the holidays.

Falling in line with general commercial practice, the Edison company expects to sell the refrigerators, when necessary, on a time-payment plan. In order to make effective an easy-payment plan, the Edison company probably will arrange for the incorporation of a finance company to buy this paper and carry it at a fair interest. Such an acceptance company would operate independently, although a number of Edison officers and managers would be stockholders.

Independent contractors are to be encouraged to participate by being given an opportunity to take advantage of the services of the finance company. This would be of considerable advantage to small dealers and contractors who would be assisted thereby in swinging a considerable volume of business without tying up their capital.

Apartment House in Portland Well Equipped Electrically

One of the modern apartment houses in Portland making extensive use of electric service is the Castle Rose Apartments, built by L. Siegle early in 1925 on the Sandy Boulevard at East Irving Street. Each of the thirty-four two and three-room apartments contains a full-automatic, Westinghouse, type E-20, bungalow electric range, and in addition one of these ranges is installed in the kitchen of the ball room, which is kept open every evening for the use of tenants and their friends. A central laundry, free to all tenants, is equipped with two electric washing machines and electric irons and ironers. The hot water heating plant burns oil and utilizes a motor-driven feed and also a motor-driven circulating pump. Unique radio service is supplied to tenants through a super-heterodyne receiver operated by the management every evening until 10 p.m. An outlet in each apartment and in the ballroom permits the attachment of a loud speaker at the desire of the tenant.

Interesting from the standpoint of the load diversity it indicates is the fact that the entire electric service for the building, including both power and light, is taken care of on a 30-kw. transformer. For the benefit of regulation this transformer is housed in a vault in the basement of the building, and in order that the beauty of the setting of the building might be as little marred as possible the 2,500-volt primary service is run underground to this vault from a pole on the street adjacent to the property.



Utilizing flagpole sockets at the curbs for Christmas trees, lighting was provided from city street-light circuits in Loveland, Colo.

Service is supplied by the Portland Electric Power Company, which also sold the kitchen equipment. The M. J. Walsh Electric Company did the wiring and installed the radio equipment. Carl Linde was the architect.

Washing Machine Company Offers Twenty-Year Guarantee

An innovation in the merchandising of electric washing machines has been introduced by the Johnson Washer Company of Oakland, Calif., in the issuance of a twenty-year guarantee with each Johnson Impeller Washer sold. This guarantee reads:

1. We hereby guarantee the above Johnson Washer to wash all fabrics that can be cleaned with soap and water.
2. To be made of the best of materials and workmanship and agree to replace, free of charge, within 20 years, any part proving defective upon return of the part, prepaid, to factory for our inspection.
3. Furthermore, if the copper tub on this washer should burn out in service while containing water, or leak from corrosion or deterioration of the metal, within a period of twenty (20) years from date of sale, we will replace it.

(Motors, wringer rolls and switches carry guarantee of their respective manufacturers.)

In discussing this step in the company's merchandising campaign, G. B. Schuyler, sales manager, said:

The policy has behind it the experience and observation of twenty-three years. During this time, Johnson washers have been subjected to all kinds of working conditions, yet over this period the cost of replacements per machine has been practically negligible. When replacement costs remain at a minimum for twenty-three years, there can be no doubt as to the conclusion nor to the logic of the policy which rests upon that conclusion. Moreover, modern advertising has made it possible for the manufacturer to deliver his sales message directly to the public, which has confidence in a product, provided its manufacturer has confidence in it. Hence, the Johnson washer twenty-year guarantee is an expression of such confidence, a bond of good faith between the manufacturer and the buying public.

Mr. Schuyler expressed the belief that the new policy would result in greater public confidence and increased sales.

Many Dealers Create Business By Means of Window Clock

Everybody who walks down the street is interested in the time of day. Nearly everyone has a watch but not all watches are accurate and it is only human nature to compare one's time-piece with one that is known to be accurate. A standard clock, that is always on time, soon becomes a matter of popular interest and forms a strong medium for drawing attention. Many electrical dealers have placed such a clock in their show windows and have found that it was of considerable help in increasing sales. Passersby soon became accustomed to stopping at the window to get the right time and their attention was drawn to the merchandise on display. Special displays and window cards to tie in have been used to promote lamp business and to develop sales on other lines. For example: one dealer, at the approach of dusk, has used a card reading "Time to light up" and has had this card surrounded by a small lamp display. Others have used different cards for different days of the week, as on Monday, "Time to put in some convenience outlets"; on Tuesday, "A good time to have your house properly wired" and so on throughout the week, featuring specials for each day.

Real Outdoor Demonstration Room Sells Appliances

Southern Electrical Company Takes Out Window to Provide Sidewalk Demonstration Space that Stops Crowds

Harking back to first principles in merchandising, when the street bazaars and markets were the only stores in existence and the merchant spread his wares on the ground on some crowded highway, an electrical establishment in San Diego is finding that old principles still work, that "there's nothing new under the sun," indeed. This firm has torn out a window from its storefront to provide itself with a demonstration space right at the sidewalk of the city's busiest street.

Many electrical establishments have utilized the same principle in degree, it is true. There have been instances unnumbered of washing machines or vacuum cleaners being demonstrated in the entrance-way of electrical stores. But it remained for the Southern Electrical Company of San Diego, the city's oldest electrical contractor-dealer, at its Seventh and Broadway store, to go the one step farther which brought the merchandising of such appliances back to first principles.

The Southern Electrical Company, in common with other electrical stores, has used demonstrations in its entrance-way, and for bigger appliances, such as washing machines and ironers, it has devoted an entire window to attracting the crowds by window action. Yet it found both these methods limited in their effectiveness in that the passerby, her curiosity aroused, could not ask questions of the demonstrator without going into the store, and often did not wish to compromise herself to that extent.

It was seen that the windows must be removed to make such demonstrations most effective, especially since the entrance-way of this branch store was not as wide as could be desired. So the window was removed and placed to the rear of the demonstration area, where it could still be utilized during evening hours to show off electrical appliances to advantage.

The idea has proved to be entirely practical. A washing machine and

ironer or vacuum cleaner can be demonstrated from this show room on the street itself at the same time. Passing crowds are stopped by the actual demonstration being carried on without intervening window. They can ask the demonstrator questions, and vice versa, the demonstrator can get at them directly with her sales appeal. An offer of a demonstration at home brings many prospects upon which the store sends out a member of its trained staff of salesmen to follow up such leads.

Other electrical merchandise is sold, too, as a consequence of the direct contact of the demonstrator with the passing crowds. The demonstration space is used effectively also during special sales of appliances.

Lamp Sales Plan Attractively Presented by Folder

Well organized and presented is the lamp sales material contained in the folder, "More Power to You," with which the Edison Lamp Works is giving its assistance to central stations in the increasing of lamp business.

The book starts out with a cartoon presentation of popular fallacies concerning the cost of lighting service, and goes on to state that the public will buy more current, more lamps, and appliances, be less apt to complain, require less correspondence from the complaint department, become shareholders and reflect to the favor of the company in political issues, if it is sold on the idea that electric service is worth every cent asked for it.

Pamphlets to be sent out with monthly bills, cards for distribution by meter readers, window displays, newspaper advertisements, forms of correspondence, stickers for envelopes, are given as examples of methods whereby this sort of educational campaign may be carried on. It is urged that the home lighting essay contest be followed up, and that monthly bills be revised to read "for Electric Service," rather than "for Kw-hr." or "Electric Light."



Out on the sidewalk to stop the passing crowds the outside demonstration space of the Southern Electrical Company of San Diego proves an effective sales builder.

NEWS OF THE INDUSTRY

Tri-State Agreement on Colorado Development Now Up to Arizona for Ratification

Aiming to have the states of the Southwest present a solid front at Washington when the question of the development of the Colorado River is brought up, representatives of the states of California and Nevada laid before Governor Hunt's Arizona Colorado River Committee a draft of a tri-state agreement in Phoenix, Ariz., Dec. 1. This tri-state agreement is to serve as a supplement to the Colorado River compact formed at Santa Fe, N. M., in 1922, that six of the seven Colorado River states approved. Arizona alone refusing to sign. Representatives of California and Nevada had drawn up and agreed upon the terms of the tri-state agreement at a meeting held in Los Angeles Nov. 30.

Concessions and guarantees are made intended to assure to Arizona an ample supply of the water and power derived from the river to enable that state to develop its own resources to full capacity. A provision whereby Arizona is to receive what it is estimated will amount to \$500,000 a year from power developments at Boulder Canyon was expected to have considerable influence in the shaping of Arizona's attitude toward the agreement.

The plan has been taken under consideration by Governor Hunt and his representatives, who have intimated that they will be prepared to submit a counter proposition at the next meeting. It is intended that this proposal will set forth clearly the conditions under which Arizona would feel justified in entering into any agreement concerning the Colorado River. Approximately ten days will be required to formulate this proposal, according to C. W. Van Dyke, chairman of the Arizona committee, which tentatively sets the date for the next conference about Dec. 15.

Briefly summarized the tri-state agreement as proposed by California and Nevada provides:

1. All water contributed by Arizona rivers to be used solely by Arizona—approximately 1,000,000 acre-ft.
2. Water which now is being used by the states is allocated definitely to the present users. Rights to this water are not in any way affected by the present proposal.
3. Allocated to California—1,095,000 acre-ft. This is the equivalent of the 1,500 sec. ft. which has been filed upon by California municipalities for domestic water.
4. Allocated to Nevada—300,000 acre-ft. in addition to the entire output of the Virgin River.
5. All remaining water to be divided equally between California and Arizona, with a provision that any of this water which is not in beneficial

use by 1975 shall be available for definite allocation to either California or Arizona. This is to protect Arizona in case California should develop a "beneficial use" for the water more rapidly than Arizona.

6. Arizona and Nevada are to be paid one dollar per horsepower of electric energy developed at Boulder Canyon. It is estimated that this will amount to \$1,000,000 per year or \$500,000 to each state.

The California legislative committee members present at the conference with Governor Hunt's committee were Senator Ralph Swing of San Bernardino County; Assemblymen Walter Little of Los Angeles, and A. C. Finney of Imperial County. Governor Scrugham of Nevada was represented by Mr. Squires and Mr. Clark, both of Las Vegas, and the entire membership of Governor Hunt's committee was present, namely, W. Van Dyke, A. G. McGregor, F. A. Reid, Thomas Maddocks and H. S. McCluskey, secretary to the governor.

Fear Park Boundary Extension Will Stop Development

Future hydroelectric power development in northern Colorado would be retarded greatly if not nullified completely by revision of the boundary lines of Rocky Mountain National Park as now proposed, according to those familiar with the situation.

Several additions of lands now held by the Forest Service are proposed by President Coolidge's co-ordination committee on outdoor recreation, but the one most in point is a strip to the south of the present park boundary. It extends along the crest of the Continental divide, lapping over from three to four miles on either side and containing approximately 60,000 acres.

On the western side of the range this territory includes the headwaters of the Colorado River. The proposed Colorado River Compact allocated something over 1,500,000 acre-ft. of the waters of that river to Colorado. All of the available water cannot be put to use on the western slope where it originates, however, and it will be available in part for conveyance to the east side by tunnels. If under the control of the National Park Service, however, it would be difficult to secure.

When investigations of water resources were being made by the Doherty Company's engineers prior to construction of the Public Service Company of Colorado's new Valmont steam plant, only two adequate sites in the state were found. One of these was in the San Luis Valley and was eliminated from consideration through its

great distance from the center of power use. The other feasible project discovered involved tunneling the Continental Divide and bringing water from the Colorado River through to the eastern side.

The logical outlet for such a tunnel would have been in Moraine park, a part of Rocky Mountain National Park. Inquiry developed the fact that it would take an act of Congress or some equally involved procedure to make this site available to use.

The only other feasible plan was found to be that of tunneling the divide from Monarch Lake on the west to a point on the headwaters of the St. Vrain River on the east. Here it was found that by angling the tunnel slightly its eastern portal could be made to escape the park boundaries.

Such a tunnel would be approximately 17 miles long and would have available for it water from a drainage area of 325 sq. mi. As all the power which it would generate could not be used at this time, the project was cast aside in favor of steam.

However, in the opinion of the investigating engineers, the time will come before many years when such utilization of western slope waters will be entirely practicable. They accordingly are alarmed at any movement to extend the park boundaries to include any of this water. In view of their investigation and the experience of others, coupled with the traditional policies of the National Park Service as regards power and reservoir filings, they feel that it would be contrary to the power interests of the state to make the rearrangement.

The lands which would be included in the park are at present a part of the Colorado National Forest and are administered by the Forest Service.

Los Angeles Electric Railway Unification Recommended

Recommending the unified operation of the lines of the Los Angeles Railway and the Pacific Electric Railway Company, a report of a joint committee of engineers has been filed with the board of public utilities and transportation of Los Angeles. The joint board of engineers was made up of J. O. Marsh, chief engineer of the city board of public utilities and transportation; L. S. Ready, chief engineer of the California Railroad Commission; and Richard Sachse, formerly chief engineer of the railroad commission but now representing the two railway companies.

The report upon which this joint board of engineers has been working for two years suggested two methods whereby unification might be accomplished: first, by city ownership of the combined properties, or second, the absorbing of the Los Angeles Railway by the Pacific Electric company.

Municipal Ownership Proves Stormy Subject at Western Division Chamber of Commerce

With proponents of municipal ownership and operation of power systems arrayed alternately between advocates of private operation on the program of one of the sessions of the third midyear meeting of the Western Division of the Chamber of Commerce of the United States, that session devoted to the general topic of "The Hydro-electric Power Situation in the West" developed into a veritable debate. The session was held at the Olympic Hotel, Seattle, Dec. 7. It was attended by about 400 delegates and guests from the eleven Western states and presided over by Paul Shoup, vice-president of the Chamber for the Western Division, and vice-president of the Southern Pacific Company, San Francisco.

By way of introducing the general topic, an animated motion picture was shown depicting the dominating position of the Pacific Coast in its hydro-electric supremacy as compared with the East, and presenting the story of the remarkable development of the electrical industry in the eleven Western states during the past forty-five years. Commencing with 15 hp. in use in 1880, a graphic story of growth in generating stations and transmission lines by five-year periods was shown to equal 4,470,000 hp. in 1925. Among the interesting analyses of this figure was that portraying the fact that only 435,000 hp. of this total had been developed under municipal ownership, the balance having been put in service through the enterprise of private initiative. The picture was prepared from data collected from all utility companies of the district by the Southern California Edison Company and produced under the direction of Herbert A. Barre, its executive engineer.

Following the picture, R. H. Ballard, executive vice-president and general manager, Southern California Edison Company, discussed the power situation in southern California. Supplementing the data given in the picture he said, "It was found that in those communities where the electric system was in the hands of business men, rather than town and city officials, the growth of the business was much more rapid."

Further, "We look back over the entire history of government ownership in vain," he said, "for any instance where any municipality or any state ever made one single major advance in the art of production, distribution and sale of electricity." Taking up the claim of government-ownership advocates, that governments can secure capital cheaper than the private companies, he pointed out that the differential between cost of capital to a municipality and to a private corporation represented taxes, which is no saving at all. Mr. Ballard stated at the beginning that his address had been prepared by John B. Miller, president of his company, for whom he was substituting because of Mr. Miller's unexpected inability to attend.

The Northwest was represented by O. B. Coldwell, vice-president and general manager, Portland Electric Power Company, Portland, in the discussion of hydroelectric possibilities on the Pacific Coast. After outlining the potential water horsepower in Oregon,

Washington and Idaho, and the percentage that had been developed, he said, "Wherever there is a plentiful supply of cheap fuel from reliable sources to be had, as in the case of many parts of the United States, even in some sections here in the Northwest, there will be a careful analysis of cost made before water power is developed, and when it can be shown that the cost of electric energy is cheaper if developed by steam power, it is certain the steam method will be used." He attacked the "common practice of advocates of government ownership of water-power developments to present estimates of cost of producing power at the power plant as the price at which power may be obtained at the customer's premises," by stating that for every dollar invested in the generation end of the business there is at least another dollar and a half invested in transmission, distribution and utilization facilities.

Power development in the Northwest under municipal ownership was discussed by J. D. Ross, superintendent, City Lighting Department, Seattle, who said, "Had there not been so much political enterprise among operators of privately owned utilities in the past few years, there would not have been so much enterprise in political operation of electric utilities." Stating that the use of electrical energy doubles every four and one-half years in the state of Washington, he urged an immediate and continuous development of the water powers of the state by both private and governmental agencies to keep up with this growth. Pointing to the Skagit development of Seattle and the Cushman project of Tacoma as signal achievements under municipal control, he said, "If we municipal fellows, inefficient as we are said to be, can make successes of these enterprises, then the private operators must make wonderful profits."

Dropping a well-aimed bombshell into the meeting at this point, Norwood W. Brockett, director of public relations, Puget Sound Power & Light Company, Seattle, next called upon to discuss private operation in the Northwest, took exception to Mr. Ross' shots that had been aimed at private operation in general and his company in particular. Denying the charge that private companies had been negligent in developing the water resources of the district, he said, "No industry has ever been turned away from Washington for lack of available power and none ever will be." He showed how a private company surveyed the market possibilities before entering into an expensive development program, proving that over-development could not possibly mean cheap power on account of the fixed charges on idle investment that it entailed.

Discussing the attempt made in the West to induce new industries to locate there, and calling attention to the investment of \$100,000,000 in his company, he urged that one way not to attract industry was by trying "to crucify the investment already here." Accepting Mr. Ross' implied challenge to deal in specific things rather than "glittering generalities", he called attention to

some of the mistakes, engineering and financial, that had been made by the city of Seattle on the Cedar River and the Skagit.

Municipal ownership in the Southwest was discussed by Ralph Criswell, city councilman, Los Angeles, and active in the Bureau of Power and Light in that city. Touching on the history of the present development by the city of 118,000 hp. in five plants located along the 234-mile aqueduct from the Owens River to Los Angeles, he showed how this development had been a side issue to the problem of supplying domestic water to the city. Referring to the cost of power at the central receiving station in the city, he stated that 40 per cent of the total power distributed by the city was generated by it at a cost of 3.3 mills per kw-hr., and that 60 per cent was received from the Southern California Edison Company for 8 mills. Later discussion from the floor brought out the fact that only the cost of forebays, penstocks and auxiliary hydraulic equipment along the aqueduct incident to power development had been charged to the investment in power plants, and that no part of the 190 odd miles of aqueduct proper from the head works to the first plant had been so charged, all of this cost having been absorbed by the domestic water system.

Mr. Criswell urged the development of 600,000 hp. on the Colorado River by means of the Boulder dam, that he said could be delivered in Los Angeles at less than 3.5 mills per kw-hr., covering all costs except possible royalties to the United States government or to the states of Nevada and Colorado. He stated such developments should be undertaken by a government agency rather than by private enterprise on account of the risks involved.

Among the resolutions passed by the convention was one covering municipal ownership, that in its key sentence said:

"We believe that local issues frequently take on a character which obscures the great fundamental principles which should determine the course of our industrial and political life. Among these principles is that of preserving to individuals the maximum opportunity for enterprising industry in order to insure to society the advantages of individual initiative. This is a cardinal principle already adopted by the National Chamber and it has our approval."

Another resolution covered the question of water conservation and control.

Insull Medal Awarded Employee of California Oregon Co.

At a fitting ceremony held Dec. 1 Howard Dynan of the California Oregon Power Company, Medford, Ore., was presented with the Insull medal for the resuscitation of Bert T. Green, a fellow employee. While working on a pole Mr. Green accidentally came in contact with a wire of high voltage, and Mr. Dynan applied the Schaefer prone-pressure method of resuscitation, thereby saving Mr. Green's life.

John B. Fiske, consulting engineer, The Washington Water Power Company, Spokane, officiated at the ceremony as a representative of the accident prevention committee of the National Electric Light Association.

Plans Announced for California Water Resources Survey

Following a conference in San Francisco with the advisory committee of the California department of engineering and irrigation, Paul Bailey, assistant state engineer, announced plans for the continuation of the water resources survey which was started about four years ago. At the last session of the state legislature \$150,000 was appropriated to carry on the work. The program outlined by Mr. Bailey is as follows:

Location on each of the main streams, of the most favorable reservoir site at the edge of the valley floors, that will serve to re-equalize the stream flow, after its use in the mountain areas for power, mining or other purposes, to the needs of domestic, industrial, irrigation, navigation and other uses on the plains below.

Determination of the cost of these foothill reservoirs and their values for all purposes, including the conservation of water, power development, flood control, storing of mining debris, etc., and their manner of operation for securing the greatest public benefits.

Underground water survey of southern California and the southern San Joaquin valley.

General layout of a co-ordinated plan for the ultimate irrigation, drainage, control of floods and reclamation of the great central valley.

General layout of a co-ordinated plan for the ultimate supply of water for all purposes in southern California and the control of floods.

Division of the general plans into units that will provide an economic program of progressive development.

The object of the survey is given as "the development of a co-ordinated plan for developing California's waters for all purposes to secure the greatest public benefit with the lowest cost to the people of the state."

The advisory committee is composed of Louis C. Hill, William Mulholland, J. B. Lippincott, B. A. Etcheverry, Walter Huber, F. C. Herrmann, A. J. Cleary, August Kempkey and G. A. Elliott.

Puget Sound Power & Light Company Acquires New Property.—The Sequim Light & Power Company, Sequim, Wash., has sold its plant and franchise to the Puget Sound Power & Light Company, Seattle, for the sum of \$80,000. The plant was owned by Joseph L. Keeler, who will become representative of the company's interests on the Olympic peninsula, with headquarters in Bremerton.

Personnel Changes in Edison Commercial Department

Several changes in the personnel of its commercial department have been announced by the Southern California Edison Company, Los Angeles. These changes, which are effective Dec. 1, are as follows:

Ray I. Carruthers is to transfer from Visalia, where he has been district manager since 1918, to the general offices in Los Angeles as assistant sales manager. Mr. Carruthers joined the Edison company in 1910 as a lighting salesman and has progressed steadily. D. H. Rowan, district manager in Lankershim, takes Mr. Carruthers' place in Visalia. Mr. Rowan began as a greater service representative in the Vernon district, later transferring to Lankershim as district manager. Ray Whitson, assistant district manager at Santa Monica, is to succeed Mr. Rowan. Mr. Whitson began work with the Edison company in 1907 as meter tester, transferring shortly to the commercial department in which he has remained. C. B. Eaton, chief clerk in Monrovia, is to transfer to Santa Monica in the same capacity. B. A. Seymour, chief clerk at Redlands, goes to Monrovia, while Erva K. Smith from the Montebello district, is to become chief clerk at Redlands. Both Mr. Eaton and Mr. Seymour have had ten years service with the company, but Mr. Smith is relatively a newcomer, having had less than three years service.

Baker River Comes in on Puget Sound System Nov. 19

The new Baker River plant of the Puget Sound Power & Light Company, Seattle, started to operate on Nov. 19, 1925, when the water behind the dam reached a level sufficient to fill the pressure tunnel and was turned through one of the 20,000-hp. turbine and generator units, there being sufficient head to generate about 10,000 kw. The opening in the bottom of the dam had been sealed some time prior to this date, and the water in the reservoir had been rising slowly.

Owing to the dearth of rainfall during most of October and early November, which was far below normal over the entire Northwest, the flow of Baker River was at a low stage for this time of year, and the process of filling the reservoir was slower than might have been expected. Torrential rains occurring toward the middle of November, however, relieved the situation to the extent that the plant was able to come in on the company's system on the date stated. Continued rise of the head behind the dam is hastening the generation of full load by both units. No difficulty in the operation of any of the equipment has been experienced, according to W. D. Shannon, superintendent, Stone & Webster, Inc., builders of the plant.

Electric Locomotives Ordered for Chile.—The Anaconda Copper Company has placed an order for thirteen Westinghouse electric locomotives for use on the lines of its subsidiary, the Chile Exploration Company. The electric locomotives will replace steam equipment on the company's property at Chiquimata, Chile. Operation will be by combination third rail, trolley and storage battery.

SEATTLE POST-INTELLIGENCER—The Newspaper of the Home—FRIDAY, NOVEMBER 17, 1925

More "Puget Power"

now BAKER RIVER

Adds 40,000 Electrical Horsepower for Industry, Appliances and Light

New Puget Sound Power & Light Company Dam Higher Than 18-Story Building

BAKER RIVER FACTS
Hydro-electric plant at Concrete, Skagit County.
Pressure development 40,000 horsepower.
Concrete dam 245 feet high.
Impounding 70,000 acre-feet of water.
Creating "Lake Shannon" 8 miles long.
Employed 1,200 men over a year.
World record in speedy construction.
Company's total hydro-electric development including Baker River, White River, Elmer, Sequim, Naches and other plants now 185,200 horsepower.

BAKER RIVER is harnessed to add its age-old strength to the upbuilding of the Pacific Northwest. • • • The urge of 40,000 horsepower today augments the surging might vibrating in our transmission lines and serving 350 cities, towns and communities in Washington. • • • The investment of over eight thousand citizens of Western Washington in our securities has aided in making this plant possible. • • • It will be added to the taxable wealth of this state and will aid in reducing the taxes not only of the people of Skagit County, where the plant is located, but of every taxpayer in the state. Just a few miles away is the plant of the City of Seattle, tax-exempt and tax-free. • • • The Baker River plant will not only light the homes and stores of the Pacific Northwest, but will furnish the power for new factories, new industries, adding more pavements and more taxable property to the entire Puget Sound District. • • • It is another step in the industrial progress of this state—additional proof that the Puget Sound Power & Light Company will always maintain an adequate supply of electric power well in advance of the needs of the district which it serves.

PUGET SOUND POWER & LIGHT COMPANY

Full-page advertisement run in the Seattle papers announcing the opening of the new Baker River plant of the Puget Sound Power & Light Company.

New Substation to Be Erected by San Diego Utility

One of the outstanding features of the 1926 construction program of the San Diego Consolidated Gas & Electric Company is a new substation, work on which will begin early in the new year. This will be known as "Substation F" and will be located in the half block south of El Cajon Avenue between Iowa and Boundary Streets.

Plans for the building and apparatus are now under way in the Chicago offices of the Bylesby Engineering & Management Corporation. A two-story structure, the building will cover an area approximately 30 x 70 ft., with a cable subway in the basement. As yet the character of architecture has not been decided upon, but it is planned to make the substation harmonize with the general character of buildings in the residence district in which it is located.

Substation F will feed the district north of Redwood Street and east of Park Boulevard, including South Park, East San Diego, Normal Heights and Kensington Park, the initial transformer capacity being 3,750 kw. at 4,000 volts. The use of supervisory control for this station will be an innovation on the San Diego Consolidated Gas & Electric Company's system.

All outgoing feeders will be underground to suitable cable poles located at some distance from the station in order to avoid overhead congestion. Street-lighting equipment and regulators will be installed on the second floor, the ground floor accommodating the switches. A suitable storeroom and workroom also will be provided.

When completed this will give the San Diego Consolidated Gas & Electric Company one of the most modern distribution substations on the Pacific Coast.

Cartoon "Movie" Used to Show Lamp Dealers Sales Methods

"The Light Brigade" is the name of a one-reel motion picture film, in combination cartoon and photographic style, which recently has been completed by the Westinghouse Lamp Company, and now is being shown at meetings of wholesale and retail electrical dealers and central stations throughout the country. The purpose of the film is to show the dealer how advertising and merchandising lamps will increase his business.

The cast consists of cartooned lamps, representing General More Sales, Colonel Sign, Colonel Window Display, Major Direct Mail, Major Newspaper Ad, Captain Lamp Demonstrator and Lieutenant E. Contract.

The film opens with photographic views of the lamp factories, showing cartooned lamp figures emerging from the exits. The lamps tell how far one day's output would reach, end to end, and while they are demonstrating this by lying down on the job, General More Sales and his staff come along and order them to get busy.

From that point, the lamp soldiers undertake, one at a time, the improvement of the lighting and display of stores, windows, signs, street lights, newspaper advertising, direct-mail advertising, lamp demonstrations and factory lighting. Each officer of the

"Light Brigade" is assigned the improvement of one of the foregoing. Verity is lent the proceedings by the device of fading out the changed cartoon store into a photographic real store thus arranged.

Engineer Honored by National Commerce Body

George Clinton Ward, vice-president in charge of construction of the Southern California Edison Company, and his associates were honored Dec. 1, by the Western Division of the United States Chamber of Commerce, which was then in session in Los Angeles. Mr. Ward was presented a bronze me-



Bronze medallion, mounted on the last piece of granite blasted from Florence Lake tunnel, presented to George Clinton Ward by the U. S. Chamber of Commerce, Western Division.

dallion mounted on the last piece of granite blasted from the Florence Lake tunnel.

Paul Shoup, vice-president of the Southern Pacific Company and vice-president of the Chamber, made the presentation. He recited the achievement of Mr. Ward and his associates in building the world-famous tunnel under the Kaiser Mountains in the high Sierra of California that was commenced Aug. 12, 1920, and completed Feb. 18, 1925, making a new world record for this type of construction.

The medallion bears this inscription: "By their works ye shall know them!"

Helena Company Goes into Hands of Receiver

With the first mortgage bonds in the amount of \$894,000 due Sept. 30, 1925, and unpaid, the Helena Railway & Light Company, Helena, Mont., was forced into the hands of a receiver by petition of the general creditors Nov. 2. This mortgage covers the entire property of the company including a railway property that had been unproductive for some time. It is understood that the principal reason the company was unable to refinance its mortgage on the maturity of its bonds was that the bond issue represented too large a proportion of the productive property consisting of the electric and gas systems. Further hampering any possible financing at that time was the circumstance that the company faced damage suits amounting to \$150,000 arising out of a wreck last December.

A. T. Schultz, formerly manager of the company, has been appointed receiver and continues actively in charge of operations. The bondholders are suing to foreclose the mortgage and have the receivership consolidated.

Customer-Owner Share Sale Gets Big Response in Colorado

The recent customer-ownership campaign of the Public Service Company of Colorado resulted in the sale of 14,620 shares of Public Service and Cities Service preferred stock. The campaign, according to company officials, was highly successful, being almost double in volume the quota established for the campaign by the New York headquarters of the company.

Although the operating division led by V. L. Board, general superintendent, sold the largest number of shares, the commercial department with C. A. Semrad, vice-president and commercial manager, as general, topped the score with the largest sales per employee and in exceeding its division quota. J. E. Loiseau's accounting army ranked second. Guy W. Faller, vice-president, was in charge of the campaign, which for the first time was tied in with similar campaigns on all of the other Doherty properties.

Report of Progress on Exchequer Dam and Power House

Good progress is being made in the construction of the Exchequer dam and power house for the Merced Irrigation District in process of erection on the Merced River 35 miles east of Merced. The dam, which will be 330 ft. high with a crest length of 955 ft., is nearly finished, about 60,000 cu. yd. of concrete being necessary to complete the structure. Openings have been left in the dam for the passage of winter floods, and it is anticipated that these openings will be closed about March 15, 1926. The relocation of 17 miles of the route of the Yosemite Valley Railroad, which originally ran through the reservoir site, is expected to be finished at about the same time.

Valves, penstocks and water wheels have been installed at the power house, and nearly all the electrical equipment is on the ground. The entire output of the plant will be absorbed at the switchboard of the Exchequer power house by the San Joaquin Light & Power Corporation, Fresno.

Substation Explosion and Fire Causes \$30,000 Damage

Failure of an outgoing feed cable (2,200-volt) at a pothead in a distribution substation of the Los Angeles Bureau of Power and Light on the evening of Nov. 24 caused a short circuit which resulted in a voltage regulator exploding and setting fire to the substation. It is estimated that \$30,000 will cover the damage done. The explosion and fire destroyed the low-tension equipment entirely, but the high-tension equipment was not affected seriously.

E. L. Goodwin, the operator in charge, was in another part of the station when the heavy explosion occurred and suffered only slight burns in attempting to extinguish the blaze.

Service in Highland Park, Sierra Vista, Eagle Rock and Garvanza was interrupted for six hours. Officials of the power bureau state that the unit-type construction used in building made it possible for the repair crew to get the station back on the line in this remarkably short time.

News Briefs

New Substation for Longview, Wash.—The Longview Public Service Company, Longview, Wash., has under construction an automatic power and light substation which is to cost \$50,000. It will supply power and light for Longview proper, getting its energy from the Long-Bell power plant. The building designed by A. N. Torbitt of Longview will be of reinforced concrete with ground dimensions of 50 x 50 ft. and height of 32½ ft. The equipment will include transformers, automatic switches and metering equipment of the latest type. The station is about to be placed in operation.

Underwriters' Laboratories Report on "Romex" Cable.—Acting on the recommendation of the engineering staff of the Underwriters' Laboratories, the Electrical Council of that body on Nov. 4 issued a notice to the industry that "Romex" cable, manufactured by the Rome Wire Company, had been examined and tested and found to comply with Underwriters' Laboratories' tentative specifications for non-metallic sheathed cables. The notice also points out that there is now a rule in the Code forbidding the use of twin wires and that the Article 5 committee now is considering necessary installation rules.

Appliance Information Hand Book to be Withdrawn from Print.—"Hand Book of Electrical Appliance Information," published by the California Electrical Bureau is about to be taken off the press. A final notice has been sent out to all electrical development leagues and others who may be interested directing their attention to this fact. The opportunity to procure these books will pass with the withdrawal of the book from print, and anyone interested in securing additional copies is urged to write the bureau at once.

Klickitat River Power Site Requested.—Permit to construct a hydroelectric power plant on the Klickitat River in Klickitat County, Wash., to cost between \$4,000,000 and \$5,000,000 is sought by Thomas A. Murray and M. Lynatt, Portland, Ore., according to an application filed with R. K. Tiffany, Washington supervisor of hydraulics. The applicants seek to divert 10,000 sec.-ft. of water from the Klickitat River. The water is to be diverted at a 150-ft. head, and it is estimated that 60,000 hp. will be developed.

Pasadena Light Bureau Rents Extra Office Space.—Need for additional space in which to handle the work of the municipal light and power department of Pasadena has caused the board of directors to authorize the rental of twenty-one rooms in the Central Building on North Raymond Avenue for a period of two years. This move is expected to take care of the department until the new city hall on Garfield Avenue is ready for occupancy. The department now is occupying the new quarters.

Idaho Plants Purchased by Eastern Company.—The Wood River Power Company, of Hailey and Bellevue, Idaho, for the last eight years owned by Irvin E. Rockwell of Bellevue, has been sold to the Consumers' Public Service Corporation of Delaware. The price was between \$400,000 and \$500,000. E. W. Rising of Hailey, former vice-president and general manager, succeeds Mr. Rockwell as president of the local company and also becomes president of the Consumers' Public Service Corporation. The principal offices of this company are in Chicago. The Wood River Power Company furnishes power to the towns of Hailey and Bellevue and to a number of large mining properties in this section.

Fallon, Nevada, Irrigation District to Build New Plant.—For the purpose of saving water for irrigation during the winter season, effecting a complete distribution of electric power to all settlements of the Newlands project, including Fernley, Hazen and Swingle Beach, and reclaiming 10,000 acres near Fallon, the directors of the Truckee-Carson Irrigation District have taken first steps to acquire the present power holdings, according to recent press dispatches. It is planned to build a new power generating plant between Fallon and Lahontan at a cost of \$250,000, and secure current during the winter months from the Pacific Gas and Electric Company of California, or the Truckee River Power Company.

Extension of Underground Service Area in Seattle Sought.—A crusade against unsightly poles and wires on Seattle's public streets and alleys has been started by John E. Carroll, city councilman, who has asked Clark R. Jackson, superintendent of public utilities, to recommend a program to the city council for the expansion of the city's underground conduit area. Mr. Carroll believes that this area should include not only the downtown section, but also those streets where property owners have assessed themselves to establish ornate street lighting facilities.

Power Company Files Articles of Incorporation.—The American River Hydroelectric Company is the name of a new power company for which articles of incorporation were filed recently with the secretary of state at Sacramento, Calif. The company has a capital stock of \$5,000,000 and contemplates the development of a power project on a site near Folsom prison. The incorporators were given as Stephen E. Kiefer, Berkeley; J. A. Talbot, Los Angeles; A. J. Cleary, San Francisco; and E. C. Chapman, Corte Madera.

Hearing on Edison Company Property Valuation Postponed.—The California State Railroad Commission has postponed the hearing of the case of the valuation of the properties of the Southern California Edison Company located in territory which has been annexed by the city of Los Angeles. The hearing, which was to have been held Nov. 2, has been set for Jan. 26 in order to give further time for the preparation of the report.

El Paso Electric Company Completes Substation.—The El Paso Electric Company, which recently changed its name from the El Paso Electric Railway Company, has completed the installation of a 1,500-kva. substation in El Paso. The station, at present having an installation of three 500-kva. transformers, is so arranged that an equal number of the same size units may be added at a later date. Service to the station is at 13 kv. by two lines, which under normal conditions are tied together, but in case of failure of either line relays disconnect the line temporarily out of service. Distribution from the substation is over two 4,000-volt circuits. Prior to the installation of the new station the system in the district was two-phase four-wire. The new system is three-phase four-wire and necessitated the changing of a considerable number of connections on transformers and power loads.

Pacific Gas and Electric Company Made Co-Licensee with Nevada Irrigation District.—In the license prepared for the signature of the Nevada Irrigation District covering the rights the Federal Power Commission has awarded to that interest (Journal of Electricity, Oct. 15, p. 307) the Pacific Gas and Electric Company is made a co-licensee, to the extent of its contract with the irrigation district. That contract provides for the power company to make payment to the district in proportion to the amount of power it is able to develop with district water. Another condition of the license is that the commission reserve jurisdiction over all water of the Middle Yuba that is not used actually by the licensee.

Company Organized to Take Over Power and Water Plants in New Mexico and Texas.—The Southwestern Public Service Company has been organized to take over a number of power and water plants in New Mexico and western Texas by C. M. Einhart and associates of the Roswell Public Service Company, Roswell, N. M. The Amarillo, Texas, plant has been purchased from the Doherty company, and franchises have been secured in several towns to which transmission extensions will be made. Loving, N. M., has granted a franchise to the company and will have a line run to that town from Otis. It is understood that the merger and new acquisitions will amount to a two million dollar deal.

Oak Harbor and Whidby Island to be Served.—The Puget Sound Power & Light Company, Seattle, plans to extend its service from Anacortes to Oak Harbor, Wash., and on to Coupeville on Whidby Island. The lines will be extended from Anacortes to Deception Pass, and from this point a submarine cable will be laid to supply the northern half of Whidby Island with current.

Edison Company to Erect Two Combination Warehouse and Garage Buildings.—The Southern California Edison Company plans to construct two new combination warehouse and garage buildings, one at 2306 Orange Street, Alhambra, and the other at the corner of Glasgow and Orange Street, Inglewood. Each structure will cost approximately \$30,000.

Northwest Electric Light & Power Association

Journal to Intensify Editorial Service in Northwest

In advising members of the Northwest Electric Light and Power Association regarding the arrangement which has just been perfected with the Journal of Electricity and that organization, Lewis A. Lewis, president of the association, has issued the following statement:

"The Northwest Electric Light and Power Association has effected, through its executive committee, an arrangement with the Journal of Electricity whereby every member of the association becomes a subscriber to the Journal without raising dues or otherwise burdening member companies or individual members. In this connection the Journal proposes to present news concerning association activities, with the view to keeping the membership at large informed of the work of the various sections and committees.

"In addition the arrangement provides for the printing of the convention papers and reports in a regular issue preceding the convention, and later the publishing by the Journal of the proceedings in book form.

"The executive committee felt that this arrangement in its entirety would benefit the association by assisting it to do a better job for its member companies and consequently for the industry."

Northwest Convention to Be Held in Spokane June 16-19

At a meeting of the executive committee of the Northwest association in Portland, Dec. 4, 1925, the dates for the 1926 convention of the Northwest Electric Light and Power Association were set at June 16, 17, 18 and 19 in Spokane. That week, following the week of the Pacific Coast Electrical Association Convention in Los Angeles, was chosen so that officials of the National Electric Light Association and other Eastern visitors to the southern convention could plan to return via the Northwest stopping off at Spokane for the convention there. No plans have been announced yet as to the program or entertainment.

Commercial Section to Hold Group Meeting in February

At a meeting of the executive committee of the Commercial Section of the Northwest Electric Light and Power Association, held at Portland Dec. 3, it was decided to hold a general group meeting of the section in Spokane in February, though no definite date has yet been set. This meeting is to be a sort of round-table discussion of various subjects to be presented by assignment and is to last two days. At the Portland meeting all committee chairmen reported on progress in the work of their committees, indicating that several subjects of interest were being studied.

Appointment of chairmen of the subcommittees of the section, recently announced by P. M. Parry, commercial manager, Utah Power & Light Company, Salt Lake City, chairman of the section, include the following: power committee—J. D. Scott, commercial engineer, Portland Electric Power Company, Portland; lighting committee—W. M. Shepard, vice-president and general agent, the California Oregon Power Company, Medford; customers relations committee—A. C. McMicken, sales manager, Portland Electric Power Company, Portland; electric cooking and heating committee—R. B. McElroy, assistant sales manager, The Washington Water Power Company, Spokane; appliance committee—V. H. Moon, appliance sales superintendent, Pacific Power & Light Company, Portland; domestic electric refrigeration committee—J. F. Orr, sales manager, Idaho Power Company, Boise; transportation committee—R. H. Ashworth, rate engineer, Utah Power & Light Company, Salt Lake City; electric range survey committee—Lewis A. Lewis, sales manager, The Washington Water Power Company, Spokane.

Executive Committee Public Relations Section Meets

Reporting the progress of the work of the various committees of the Public Relations Section of the Northwest Electric Light and Power Association, several chairmen of the subcommittees attended a meeting of the executive committee of that section held in Portland, Dec. 4.

A new committee this year is the industrial relations committee, headed by Col. H. G. Winsor, personnel officer, Puget Sound Power & Light Company, Seattle, who stated that his committee intended to study the following five subjects: Employment, compensation, training and education, thrift plans, and health. Mrs. L. A. McArthur, Portland, chairman of the Women's Committee, reported that fourteen groups of women in different localities have been organized. She also reported on the results of the Salt Lake meeting in October.

Considerable discussion as to the kind of public speaking most desirable was aroused by the report of J. B. Fisk, consulting engineer, The Washington Water Power Company, Spokane, chairman of committee in charge of public speaking. Another report bringing forth discussion was that of Dwight Ware, manager, Puget Sound Power & Light Securities Company, Seattle, chairman of the customer-ownership committee. Both these chairmen left the meeting with valuable suggestions to guide committee activities for the year.

W. H. Ude, director of public relations, The Washington Water Power Company, Spokane, chairman of the section, reported for the committee on relations with educational institutions, in the absence of its chairman, A. J.

Priest, attorney for the Idaho Power Company, Boise. The meeting was addressed by Lewis A. Lewis, sales manager, The Washington Water Power Company, president of the association, who told of his recent trip to Chicago where he attended a meeting of the Public Relations National Section.

Cooking and Heating Committee Attracted by Range Tests

A meeting of considerable interest to both the Northwest and Pacific Coast associations was that of the cooking and heating committee of the Commercial National Section of the Northwest Electric Light and Power Association held at Salt Lake City, Dec. 7 and 8, 1925. C. O. Dunton, Central Illinois Power Company, Springfield, Ill., chairman, determined to hold this meeting in the Northwest on account of the tests being conducted there by the range survey committee of the Northwest association and now nearing completion. A final report of the results of the test is to be prepared for presentation at the National Electric Light Association convention next May.

As a result of the Salt Lake meeting, the Pacific Coast Electrical Association will be invited to undertake a similar survey on metered water heating in California next year.

P.C.E.A. News

Technical Section Announces January Meetings

It is planned that the Fairmont Hotel in San Francisco will be the seat of action for the next regular convocation of the Technical Section. The dates for the meetings have been confirmed as suggested at the Los Angeles meetings in September, Jan. 13, 14 and 15.

Serial Reports Published by Technical Section

A serial report entitled "First-Aid Talks" has been published and released by the accident prevention committee, Technical National Section, N.E.L.A. The first-aid talks contained in this report are intended as a guide and text book for those teaching first aid. The information is presented in non-technical terms so that ordinary laymen, such as managers or superintendents, can give the course to their employees. There is some excellent material in this publication. The price to members is 40 cents.

Four serial reports have been published by the prime movers committee of the Technical National Section, N.E.L.A., and are ready for distribution. These reports are: Power Station Heat Balance; Development of Equipment; Pulverized Fuel; and Higher Steam Pressure Than Temperature. All of these are credited to the 1924-25 committee. The price to members of each of these reports is 40 cents, 10 cents, 45 cents and 30 cents, respectively.



News of the Electragists



California Electragists Have Interesting Meeting at Sacramento

Association work, trade policy, business problems, industrial lighting, and the Red Seal plan were among the major topics discussed at the quarterly convention of the northern division of the California Electragists that was held at the Senator Hotel, Sacramento, Dec. 5, 1925.

The executive committee held its meeting at 10 a.m. It was decided that an executive committee consisting of one member from each district

fact that the electragist movement is attracting the attention of this important branch of the industry to the extent that it insists on having an electragist on its executive committee.

H. H. Courtright, Valley Electrical Supply Company, Fresno, urged that an effort be made toward having segregated figures taken for electrical work instead of having them included in the general figure for the entire building.

J. C. Hobrecht, J. C. Hobrecht Company, Sacramento, spoke on the subject of electrical merchandising.

General Open Meeting

The general open meeting was held in the afternoon at 2:30. C. Felix Butte, president, outlined his plan of conducting the Association during his term in office. He stated that he hoped to build up the attendance at the meetings by having a larger number of the members take an active part in them. A more harmonious personal relationship between members was urged. Trade policy as outlined by the electragists was stressed as being worthy of the support of every member. Mr. Butte stated that all electragists should maintain a high standard of business principles at all times. The work of the California Electrical Bureau was highly praised, and the administration pledged itself to support its activities in every way possible. The Red Seal plan will be carried on aggressively and the co-operation of the members was requested.



Edward Martin, secretary of the Northern Division of the California Electragists, was very active at the meeting held at Sacramento, Dec. 5. Mr. Martin is proprietor of the Sterling Electrical Company of San Francisco

should be appointed by the chairman. The membership roll of the electragists will be sent to the power company representative in each district in order to identify the members and bring about a closer co-operation between them and the power companies.

Members' Meeting

The closed members' meeting was called to order by C. Felix Butte, president, at 11 a.m. with thirty-seven members in attendance. Mr. Butte appointed a number of committees made up of members in the outlying districts as well as those in the centers of population. He stated that in this way it was hoped that a larger number of the members would be in closer touch with the activities of the organization.

C. J. Geisbush, executive secretary of the southern division of the California Electragists, addressed the members on the electragist movement with special emphasis on the trade policy of the electragists.

H. C. Reid, H. C. Reid & Company, San Francisco, told the members of the strides that have been made by the San Francisco Association of Electrical Contractors and Dealers in eliminating errors in estimating and of other association activities.

C. L. Chamblin reported on his attendance at the meeting of the executive committee of the National Electric Light Association. He pointed out the

H. N. Nelson, Enterprise Electric Works, San Francisco, read a paper containing extracts from the business guide, "Know Your Business," which was presented at the Lebec Convention of the southern division of the California Electragists and which has since been published by the Electrical Supply Jobbers.

Clark Baker of the National Lamp Works addressed the meeting on the industrial lighting plan. He stated an advertising program is being conducted nationally which is using twenty-three publications. Three mailing folders and one booklet have been prepared as follow-up material in response to definite requests. Mr. Baker said results already have been obtained in the form of requests for pamphlets, layouts and actual sales of installations. He urged that all electragists get in touch with the committee in their district if this had not been done.

Clyde Chamblin reported on the status of the Red Seal plan. He stated



C. J. (Cy) Geisbush, executive secretary of the Southern Division of the California Electragists, drove all night in order to be in Sacramento in time for the meetings of the Northern Division. He was accompanied by Paul H. Needham of Beverly Hills and Lee C. Baltzelle of the J. J. Farley Electric Company, Fullerton.

the program probably will be launched in full force after the first of the year. He urged members of the industry to sell themselves and install the equipment in their own homes before trying to sell it to the public.

Victor W. Hartley, executive secretary of the California Electrical Bureau, also spoke on the Red Seal plan and stated the Real Estate Association had requested for its publications several articles on how it can use the Red Seal plan in selling homes.

C. J. Geisbush outlined his viewpoint on the electragist movement based on two years observation in southern California. He stated it is building up a keen sense of trade loyalty and pride in the work of the members and an appreciation of their position in the industry. He also spoke of the increased interest that is being taken in the movement.

Seventy electragists from the San Francisco Bay district chartered the steamer Navajo to make the trip, leaving San Francisco Friday night and returning Saturday night.



L. Siebert (right), Drendell Electrical Manufacturing Company, San Francisco, who was winner of the golf tournament held at the meeting of the Northern Division of the California Electragists in Sacramento, Dec. 5, and S. P. Russell of the H. B. Squires Company of San Francisco, who won second place.

L. R. Wheeler, formerly a member of the Los Angeles Electric Works of Los Angeles, has sold his interests in that firm and purchased the Griffith Machine Works. In addition to conducting a general motor repair department he will manufacture a new electric drill.

Northwest Electrical Inspectors Will Organize in January

With the object of reducing fire and personal hazards from electrical causes, those interested in electrical inspection in Oregon and Washington are organizing the Northwest Association of Electrical Inspectors, and the first meeting is to be in Portland, Jan. 11-12, 1926. Leaders in the movement are H. A. Patton, electrical engineer, Washington Surveying and Rating Bureau, Seattle, and F. D. Weber, electrical engineer, Oregon Insurance Rating Bureau, Portland. Mr. Weber, whose mail address is Box 745, Portland, Ore., is acting as temporary secretary of the proposed organization and already has received favorable replies to his appeal indicating that some twenty individuals in each state will join as active members.

A tentative constitution providing for an organization modeled after the California association has been drafted to be passed or amended at the January meeting. This provides for three classes of membership: active, associate and industrial. Active members shall be persons engaged in inspecting or supervising inspection of electrical installations in behalf of city, county, state or national authorities, or of insurance organizations. Associate members shall be persons engaged in inspection in behalf of public service agencies other than the above, while industrial membership shall include those engaged in electrical industry as engineers, contractors, manufacturers, and members of electric public utility companies.

With the desire to provide a particularly interesting program at the first meeting, the organizers have been active in inducing some nationally known men of the industry as well as

local authorities to attend and present papers on subjects pertinent to the work of the association. Among those who it seems reasonably certain will be on the program are R. J. Larrabee, engineer of the San Francisco branch of the Underwriters Laboratories, Inc., Chicago; C. W. Mitchell, electrical engineer, Board of Fire Underwriters of the Pacific, San Francisco, also secretary of the California Association of Electrical Inspectors; H. B. Kirkland, Society for Electrical Development, New York; W. J. Canada, electrical field secretary, National Fire Protection Association, New York; L. W. Going, electrical inspector, city of Portland; J. C. Caine, deputy electrical inspector, Portland; and E. B. Morrison, assistant electrical engineer, Oregon Insurance Rating Bureau, Portland.

It is understood that this program is not final nor complete, and the organizers hope that manufacturers will avail themselves of the opportunity of bringing exhibits to the meeting. The meeting will be open to all interested persons or organizations.

CALIFORNIA ELECTRAGISTS, NORTHERN DIVISION, COMMITTEES

Architects and Engineers

William Bernhardt, Berkeley.
J. H. Hilfiker, Eureka.
R. Perry, Fortuna.
L. Jeffrey, Fresno.
Chester E. Hershey, San Jose.

Code and Regulations

Victor Lemoge, San Francisco.
Sam Fingerhut, Bakersfield.
G. R. MacLaren, Fairfax.
F. Dahlquist, Ferndale.
C. Vining, Sacramento.

Convention and Meetings

Carl Strom, Alameda.
Jim Baker, Bakersfield.
H. H. Fenneman, Hayward.
R. Mixer, Lodi.
John Holt, Santa Cruz.

Cost Data

George Smith, San Francisco.
E. E. Elzea, Fresno.
H. E. Howard, Los Gatos.
J. C. Kerr, Manteca.
O. A. Mundell, Santa Rosa.

Credit and Accounting

C. Collonan, San Francisco.
C. A. Rochester, Berkeley.
William Murphy, Stockton.
W. Eklund, San Rafael.
J. A. Foster, San Mateo.

District Activities

Clifford Prudhomme, Sacramento.
C. F. Mausser, Burlingame.
L. Stinchfield, Martinez.
S. Henderson, Turlock.
O. W. Morton, Sonoma.

Finance

H. N. Nelson, San Francisco.
W. D. Evans, Salinas.
Jack Mehrtens, San Francisco.
E. Hiester, Oakland.
G. C. Foss, Sacramento.

Golf and Outdoor Activities

Arthur Dahl, San Francisco.
C. B. Kenney, San Francisco.
L. A. Poland, Eureka.
W. Spencer, Oakland.
T. Rosenberg, Oakland.

Membership

A. K. Carson, Bakersfield.
Fred Sundberg, Eureka.
Charles Shipman, San Francisco.
Oscar Abbott, Hanford.
D. M. Bird, Chico.

Publicity

R. J. Finchley, Sacramento.
J. A. Schanbacher, Watsonville.
M. E. Ryan, Redwood City.
A. R. Hancock, Willows.
E. Milbourne, Yreka.

Standards and Data

C. W. Miller, Alameda.
T. M. Robinson, Fresno.
J. M. Nightingale, Modesto.
Walter Cox, Santa Cruz.
J. Stanovich, Watsonville.

Trade Policy

C. L. Chamblin, San Francisco.
H. H. Courtright, Fresno.
J. C. Hobrecht, Sacramento.
R. M. Butcher, San Jose.
H. W. Jacobs, Santa Rosa.

Power Companies

C. B. Kenney, San Francisco.
H. N. Nelson, San Francisco.
J. C. Carlson, San Francisco.
C. L. Chamblin, San Francisco.
J. C. Hobrecht, Sacramento.
H. H. Courtright, Fresno.



Baseball team of the Newbery Electric Corporation which won the 1925 Electric Club baseball series; this team also won the 1924 pennant. It played the 1924 and 1925 series against all electric companies in Los Angeles and lost only two games in the two years. The cup in the foreground was presented by the Electric Club of Los Angeles. Reading from left to right the men in the picture are: standing—D. D. McFarlane, "Doc" Beaton, "Matt" Clark, H. Kennedy, "Al" Blodgett, Charles Ames, Jim Heavens, Paul DeBroux; sitting—Howard Burdick, "Al" Hetchko, and Roy Thurston

Colton Electric Company has moved to a new location at 282 North Eighth Street, Colton, Calif. It was formerly at 170 West I Street.

The Fellstrom Electric Company, Seattle, has moved from its location at 1428 Railroad Avenue to larger quarters at 2131 Western Avenue. The firm specializes in electric motor sales and repairs as well as general electric contracting. Carl E. Fellstrom, manager, has been in this line of work for twenty-three years.

Edmund A. Cullen has been named to succeed Thomas W. Nixon as the advertising manager of the monthly bulletin issued by the Denver Electrical Contractors' Association.

Santa Ana Electric Company has been opened at 118 E. Fourth Street, Santa Ana, Calif., by E. R. Christensen. Mr. Christensen was formerly with the Cope Electric Company.

T. I. Smith has remodeled his entire store at 631 E. Broadway, Glendale, Calif. The new store is double the size of the old one and has a very practical arrangement. Separate booths for showing fixtures and demonstrating radio are a feature of the new store. An opening was held on Nov. 21 and a great number of customers and prospective customers viewed the new store.

Book Reviews

NIAGARA IN POLITICS

By JAMES MAVOR, M.A., Ph.D., F.R.S.C., Emeritus Professor of Political Economy in the University of Toronto. Cloth; 5¼ by 7½ in.; 255 pp. E. P. Dutton & Company, New York, N. Y. \$2.00.

Perhaps no political organization has aroused greater comment and discussion in this country and in Canada than the Ontario Hydro-Electric Commission. Because it is the greatest publicly owned plant in the world, its organization and operation have been the subject of papers and addresses whenever and wherever municipal or state ownership of public utilities has been broached. In this book the late Dr. James Mavor, author of the "Economic History of Russia," endeavors to prove by collected evidence that the Ontario Hydro-Electric Commission has tried through the help of politics to eliminate competition and to make itself an absolute monopoly at the expense of the public interest and pocketbook.

The author contends that in the first place the Commission is not a typical example of "public ownership" at all but is "really an attempt on the part of a small number of politicians to establish an industrial monopoly and to manage this monopoly in such a manner as to keep themselves in power." To quote from the introduction:

"The Hydro-Electric Commission of Ontario affords in the course of its history very vivid instances of the use to which a combination of economical monopoly and political power may be put. Since the Commission was established, there have been one Farmer's Government and three Conservative Governments. All of these, as well as the contemporary oppositions, have been under the control of the Hydro-Electric Commission. All of the Governments, often greatly against their will, have been obliged to find the enormous sums of money demanded by the Commission for the carrying out of its projects. All of the Governments have repeatedly been called upon to legalize by ex post facto legislation, acts done by the Hydro Commission in flagrant violation of Statute Law and even of the Acts passed in behalf of the Hydro itself. In attempts at self-protection, the Governments have nominated members of the Commission committed to their interests."

Efforts at bringing to light facts regarding the operations of the Commission have met with failure because the Hydro held absolute control of the provincial government. Regarding this phase of its operation Dr. Mavor says:

"... Government after Government in self-protection against condemnatory criticism, which came naturally from the quarters in which they were attempting to raise the necessary loans, appointed special Commissions of Inquiry and special audits of the Hydro-Electric accounts. In spite of disclosures which would have ended the career of any ordinary politicians, these investigations all somehow missed fire. Successive governments have remained

tied to the Hydro-Electric enterprise, with very inadequate control over it, yet full responsibility for it to the people, bound to find whatever extravagant amounts its administration demanded and hoping for some miracle by which they might be relieved from what had become an almost intolerable incubus."

Discussing the leasing of the natural resources of a nation and regulation of the parties to which leases are made, Dr. Mavor says:

"When a Government leases or sells the natural resources of a country it retains its visitatorial power or right of inspection and criticism. This right is inherent in the Government and may be exercised in the public interest in respect to any public or private enterprise whatsoever. The Government as trustee for the public is ex-officio critic. Whenever the Government, either as a Government or in the form of an organ created by it and insusceptible of differentiation from it, assumes operation of an industry, especially when to this operation there is added the incident of monopoly, there ceases to be any independent official critic of that industry. Moreover, anyone within the Government industry or outside of it who ventures to criticize the industrial proceedings of the Government or the financial soundness of its enterprises is denounced as an enemy of the people, as an agent of profiteers or of the interests of capital or whatnot. Criticism under these circumstances is either rare or non-existent. An auditor who dared in the course of his professional duties to object to expenditure would be presented with the alternative of withdrawing his objection or adversely affecting his professional career. An engineer who pointed out some weakness in the technical aspects of the Government undertaking need not hope for Government patronage in the future. A newspaper which ventured to criticize the undertaking would speedily be deprived of Government advertising. By these means it is very clear that a Government which embarks upon a large scale in industrial enterprise encounters strong temptations to act in an arbitrary manner. It cannot afford to have the defects of its administration disclosed. It must close the mouths of critics. In this way, the Government and its enterprises are defended by a reign of terror, varying in its incidents according to the country and to the stage of social development. Such a reign of terror has been established by the Ontario Hydro-Electric. Its newspapers can be counted on to suppress information unfavorable to it and to abuse anyone who ventures to raise his voice upon its imperfections; its advocates in the municipalities and in the local legislature denounce everybody who calls it in question, demanding his dismissal from any public office which he may occupy and pursuing him with all the ruthless invective at their command. By these means the Hydro-Electric has acquired a strangle hold upon Ontario, plunging it into over two hundred millions of debt and embarrassing its finances and its credit."

Overfinancing and mismanagement, together with an extraordinary amount of power, have opened the door to temptations which officials of the Commission have not had the moral stamina to resist, the author contends.

Commenting upon the much discussed question of rates, he states:

"The popularity of the Hydro-Electric has been promoted by the ingenious device of giving domestic light service in the centers of population at abnormally low rates while the rates for power are relatively high within the same areas. In the rural districts where the population is scanty and the votes distributed, the rates alike for domestic service and for power are abnormally high. Only the monopoly of supply which the Hydro has established renders such rates possible. There is no appeal and even where in some cases gross injustice has been perpetrated, there is no redress, for by an Act passed in the interests of the Hydro, the law courts are closed against any suit that may be brought against it."

In a brief review such statements as are quoted cannot be substantiated, but in his text Dr. Mavor offers voluminous proof for his remarks in the form of written reports, public statements by officials of the Commission and others. His case against the Commission is most complete and apparently will stand up under such refutation as those in charge of the Commission undoubtedly will attempt to make.

In recommending the book to our readers, who are vitally interested in the subject of Ontario because of the part it has played in the arguments in favor of state ownership in California, Washington and Oregon, we can say that its pages "show conclusively that the Ontario Government committed a fatal error in permitting what was originally designed to be an investigating, inspecting and controlling department of the Government, to transform itself into a monopolistic enterprise, to legislate itself outside of the law and to conduct itself in so arbitrary a manner that it has become wholly out of place in a democratic country." G.C.T.

Electric Handbook for Petroleum Men.—To acquaint the field men of the petroleum industry with the fundamentals of electricity the Westinghouse Electric & Manufacturing Company has published a handbook on the subject. This 31-page booklet starts in with an exposition of such fundamentals as Ohm's Law and goes on through much usable information concerning methods of installing and caring for electrical equipment peculiar to the petroleum industry. Numerous diagrams and several tables are given. The publication is known as Special Publication No. 1731 and copies may be obtained from the publishers upon request.

Geological Survey Publishes Report on Colorado River.—A comprehensive report on the Colorado River has been published by the Department of the Interior based on engineering studies made by the Geological Survey. The report, known as Water Supply Paper 556, was prepared by E. C. LaRue, hydraulic engineer, who has made a study of the Colorado River for the last fifteen years. It deals with the comprehensive development of the river below the mouth of Green River, with particular reference to flood control and the development of hydroelectric power.

Meetings

Dairy Farm Electric Equipment Committee Meets

Portable motors, power study of farm-dairy plants, and inexpensive electrical sterilizers were among the important subjects considered by the Dairy-Farm Equipment Committee of the Committee on the Relation of Electricity to Agriculture which met at the Pacific Slope Dairy Show held in the Oakland Auditorium, Oakland, Calif., in November.

Development of further uses of small motors, the possible design of a good portable type, and consideration of extensions, outlets, and similar problems will be handled under the leadership of T. A. Reid of the Westinghouse Electric & Manufacturing Company. The motors which are to receive the major attention of the committee will be 3-hp. and less.

A power study of farm-dairy plants will be made by the use of a questionnaire covering the time equipment used, the power consumed, and the operations performed. Dr. J. J. Frey, chairman of the committee, stated that the co-operation of the state dairy inspectors would be extended in obtaining the detailed information required in the questionnaires.

Report on Electric Sterilizers

A. W. Farrall presented a report of the work which has been done under his direction in testing dairy sterilizers. Two manufacturers who have built electrically heated dairy sterilizers, co-operated with the committee enabling them to test these sterilizers and obtain the data contained in the report.

Both of these sterilizers were of the square galvanized iron-tank type, there being three types of covers: (1) the ordinary single-thickness removable metal cover, (2) a double-thickness insulated-type removable metal cover, and (3) a single-thickness hinge-type metal cover. All sterilizers were of the four-can size. All used electricity for heating, provision being made in the bottom of the tank for the heating element. The elements were designed for 220 volts and operated on a 220-volt circuit; the voltage varied, however, between about 226 and 240.

After carefully observing the operation of these sterilizers and computing the cost of the power actually used, the committee feels that the electrically operated sterilizer is a perfectly feasible appliance. Certain refinements are necessary which do not call for anything inconsistent with mechanical practice or for any great outlay of money. The following conclusions, subject, however, to alteration with future tests, have been arrived at:

(1) The amount of water should be kept at a minimum; (2) as large a heating unit as is practical from the standpoint of space and first cost should be used; (3) it seems advisable to use some method of heat insulation of the cover, and possibly of the tank; (4) some automatic method should be installed that will cut out the current

and hold the circuit open as soon as 210 deg. F. is reached; (5) the sterilizer should be used on the same line with some such load as a 5-hp. motor, being controlled through a double-throw switch; (6) method of sterilization might be altered so as to use the power only long enough to maintain the vessels at a sufficiently high temperature for 20 minutes instead of having the power on during the entire time.

The difference in time required in using a 3-kw. heater and 5-kw. heater seems to be very much in favor of the larger unit. The smaller unit required an average of about 50 minutes while the larger unit required an average of about 21 minutes, amounting to 1.75 kw-hr. for the larger and 2.5 kw-hr. for the smaller.

The effect of insulating is shown in a test on the same sterilizer. In the first case it took 56.5 minutes to raise the water to 210 deg. F. and the second an average of 47 minutes, a saving of 9.5 minutes, or, since this was a 3-kw. element, nearly 0.8 kw-hr.

One of the manufacturers has agreed to make up a cover using air space for insulation instead of a lagged space, and further tests will be run. Permission has been obtained from several dairymen to place sterilizers on their farms and assist in keeping accurate records of the power consumed, water used, utensils sterilized, time required and other important data.

It would seem from the tests that have been run that, using a power rate of 2 cents per kw-hr., the cost of

Northwest Women's Committee Has Enthusiastic Meeting

The Women's Committee of the Public Relations Section of the Northwest Electric Light and Power Association has volunteered to present one or more skits at the association convention next June as a feature of the convention entertainment. This was one of the decisions reached at the first meeting of that committee in the office of the Utah Power & Light Company, Salt Lake City, Oct. 23, 1925. Representatives from most of the member companies of the association were present, and all were enthusiastic in their willingness to take up this new activity making the women of the industry an important factor in public relations work.

Among the plans for an active year the committee decided to issue a booklet containing non-statistical information concerning the electrical industry as a whole, explaining such policies and practices as are less well understood by the layman, and as are broached frequently in the ordinary contact between employees and customers. This booklet is designed for circulation among the friends of employees as well as among those that may not have a friendly attitude toward the industry.

Considerable time at the meeting was consumed in preparing an answer to the questionnaire from the National Women's Committee intended to collect from the divisional committees their ideas on proposed activities and on the means to be employed to attain certain ends. The committee decided to hold two more meetings during the current association year, the first to be held in Seattle in February, 1926, and the time and place of the second to be set at that meeting.

The meeting was presided over by its chairman, Mrs. L. A. McArthur, Portland, and was addressed, after having been called to order, by D. C. Green, vice-president and general manager, Utah Power & Light Company.

Lighting Meeting at Riverside Opens Industrial Campaign

At a meeting held in the Riverside office of The Southern Sierras Power Company recently D. C. Pence, of the Illinois Electric Company, Los Angeles, and member of the educational committee of the Industrial Lighting Committee, Pacific Coast division, N.E.L.A., conducted an interesting and instructive discussion on the subject of industrial lighting.

Local superintendents from nearby points, together with contractor-dealers from their respective stations and from Riverside, together with the members of the commercial department sales force, were in attendance.

Merchants and Property Owners Hear Lighting Talk.—"Business Follows Light" was the subject of an address by Morris C. Hixson, sales manager of the Edison Lamp Works, San Francisco, before 75 merchants and property owners on First Street north of San Fernando, San Jose, at a meeting held at the Hotel Vendome in that city. A permanent organization is to be formed as a result of this meeting to evolve a proper lighting scheme for this district, including signs, show windows and store lighting.

COMING EVENTS

Technical Section, P.C.E.A.—

Conclave—Fairmont Hotel, San Francisco
Jan. 13-15, 1926

California Electragists, Southern Division—

Quarterly Meeting at Catalina, Calif.
Jan. 23-24, 1926

Rocky Mountain Division, N.E.L.A.—

Section and Committee Conference
Idaho Springs, Colo.
Jan. 25-26, 1926

Electrical Men of Colorado—

State-wide meeting under sponsorship of
Electrical League of Colorado
Denver, March 26, 1926

Pacific Coast Electrical Association—

Annual Convention—Biltmore Hotel, Los Angeles
June 8-11, 1926

National Association of Railroad and Utilities Commissioners—

Kansas City, Baltimore Hotel
Feb. 9-12, 1926

sterilization is less than 4 cents per run.

The committee also discussed the destructive effect of electric current on bacteria. A bibliography covering this subject will be prepared.

Proper illumination for barns was discussed, and the committee will offer its co-operation in the carrying on of extension work and investigation and promotion of the correct lighting for barns.

A new project was suggested by Dr. Frey which has to deal with the disposing of septic tank sludge, particularly with the trouble given by casein which clogs up the sewers. A bibliography will be prepared on this subject.

Personals

H. H. Jones has been named vice-president and general manager of the Western States Gas & Electric Company, Stockton, Calif., succeeding Samuel Kahn, who recently became executive vice-president of the Market Street Railway Company, San Francisco. Although Mr. Jones for the last eighteen months has been in Minneapolis, Minn., as vice-president in charge of operations of the Northern States Power Company, he needs no introduction to the electrical fraternity of the West, for prior to his so-



H. H. JONES

jour in Minnesota he spent fourteen years as president and general manager of the San Diego Consolidated Gas & Electric Company, San Diego, Calif., a Byllesby property, as are the other companies mentioned. Before going to San Diego he served for a year as manager of the Sandpoint Division of the Northern Idaho & Mountain Power Company, now the Mountain States Power Company. Mr. Jones' early business career was associated with railroading, and he was connected at various times with the Chicago, Peoria & St. Louis Railway, the City of Reading, Pa., the Pennsylvania Railroad, the Chicago & Northwestern Railroad, and the Consolidated Railway Company of Springfield, Ill. Mr. Jones graduated from Lehigh University with the degree of civil engineer. He was born in Reading, Pa. His knowledge of the utility field and his familiarity with Western conditions make his new appointment particularly appropriate, and his many friends in the electrical industry on the Pacific Coast will be glad to welcome him back.

George Gregory, Jr., of the general merchandising department, New York, and Howard Dye, stores manager, Denver, Colo., both of the Western Electric Company, visited Salt Lake City not long ago.

H. A. Hammond is now the representative in the San Francisco Bay district of the Appleton Electric Company of Chicago. He has offices with Electric Agencies, Inc., at 655 Minna Street.

G. O. Hodgson, district sales manager of the Edison Lamp Works of the General Electric Company, Denver, Colo., was a visitor in Salt Lake City recently. Mr. Hodgson is one of the directors of the Lighting School to be held in Denver early in 1926. He is also one of the active members of the Electric League of Colorado.

C. E. Heise, district manager, Westinghouse Electric & Manufacturing Company, San Francisco, was the principal speaker at a recent meeting of the Oakland Electric Club. Mr. Heise outlined the history of electrical development and the part played by the late George Westinghouse in making the use of electricity practicable.

George H. Dern, governor of Utah, George M. Bacon, state engineer, and W. R. Wallace, Utah member of the Colorado River Commission, attended the recent hearing of the Federal Power Commission in Washington, D. C. Mr. Wallace and Mr. Bacon also attended the hearing before the senate committee on irrigation and reclamation at Los Angeles.

Geneva Eldredge and Winifred Ralston, of the publicity department of the Public Service Company of Colorado in Denver, have been awarded the prize offered by the Doherty News for the best correspondence submitted from any of the Doherty companies. To Edward Winship, of the gas department of the company, special credit was given for the cartoons accompanying the news items.

J. D. Nicholson, formerly Salt Lake City manager for the Mine & Smelter Supply Company, and assistant to the manager since his transfer to Denver several months ago, has been named assistant manager of the company.

Frederick Thompson, vice-president of The Pacific Electric Manufacturing Company, San Francisco, lately returned after a tour of Eastern cities. While in Chicago he opened a company office there.

Clyde H. Thayer, formerly in the commercial department of the Portland Electric Power Company, Portland, at its St. Johns office, has been promoted to be resident agent of that company in its newly acquired district at St. Helens, Ore.

Ray W. Turnbull, assistant Pacific Coast sales manager, Edison Electric Appliance Company, Portland, visited Spokane not long ago, and made a trip over the system of The Washington Water Power Company in company with J. E. E. Royer, assistant to the general manager, and J. F. Farquhar, general agent of the power company.

J. J. May will be resident manager of the display room newly opened at Pasadena, Calif., by the Empire Lighting Fixture Company of Los Angeles.

Julius Hooper, of the Rainier Electric Company, Seattle, lately returned from a visit of several weeks in the East.

M. F. Steel, Pacific Coast manager of the Benjamin Electric Manufacturing Company, with headquarters at San Francisco, was a visitor in Salt Lake City a short while ago.

C. C. Mattson, formerly electric superintendent of the Marin district of the Pacific Gas and Electric Company, San Francisco, has resigned to accept a position with the Los Angeles Gas and Electric Corporation, Los Angeles. S. G. Olson, of the general office of the Pacific Gas and Electric Company, has been appointed to succeed Mr. Mattson.

A. T. Slack, veteran Western Electric Company salesman, has been transferred from the Wyoming district of the company to the Denver territory. Emil Nelson of the Denver branch also has been assigned to the sales department in that city. L. E. Bruce has been named to succeed Mr. Slack in Wyoming.

Gordon Gillespie, formerly voucher clerk for the northern district of the Puget Sound Power & Light Company, at Bellingham, Wash., has been promoted to the auditing department of the company at Seattle.

W. L. Fitzpatrick, general auditor, Mountain States Power Company, Tacoma, recently made a three weeks' trip to the East on business for his company.

B. E. Rowley, Rocky Mountain district manager of the Edison Electric Appliance Company with headquarters in Salt Lake City, was a visitor at the advisory board meeting of the Electrical League of Colorado in Denver a short time ago.

G. B. Kirkwood, for several years connected with the engineering department of The Pacific Electric Manufacturing Company, San Francisco, has been placed in charge of that company's newly opened office in Chicago.

R. W. Lindley, recently sales manager of the northern district at Bellingham, Wash., for the Puget Sound Power & Light Company, Seattle, has been promoted to be manager of merchandise sales of that company with headquarters at Seattle. His childhood was spent in Illinois, but at an early age he moved to the West from Alton, settling in Lynden, Wash., in 1890. His entry into the public utility business dates from Jan. 1, 1906, when he entered the employ of a forerunner of the Puget Sound Power & Light Company in the railway department. After six months as motorman and dispatcher



R. W. LINDLEY

he became a clerk in the office and later was assigned to outside sales work. He was promoted to be sales manager at Bellingham in 1915 and held this position until his recent promotion. In his new position he heads a newly created department under H. J. Gille, sales manager. He will supervise the systematic sale of electrical merchandise throughout all the districts of the company, arranging the details of campaigns on special articles and co-ordinating the efforts of the district sales departments.

Raymond Ackerman has been appointed to represent the Benjamin Electric Manufacturing Company in Utah, Idaho and eastern Nevada. He will be located at 216 South West Temple Street, Salt Lake City.

R. E. Smith, advertising manager, Southern California Edison Company, Los Angeles, accompanied the Rotary Club of that city on its recent pilgrimage to the San Francisco Rotary Club and was one of the speakers at the joint meeting.

R. G. Chamberlain, district manager, Hurley Machine Company, Seattle, was in Spokane a short time ago on general sales matters.

C. A. Harrison, whose appointment as assistant to the general superintendent of the Public Service Company of Colorado has been announced, is a native of Colorado. He received his education in the schools of Colorado Springs and in Colorado College, from which he graduated in 1916 with honors and an A.B. degree. His predecessor in office was A. F. Morairty, who is now commercial manager of the Central Arizona Light & Power Company, Phoenix. Mr. Harrison's first practical experience was with the engineering department of the Western Union Telegraph Company. In March, 1917, he entered the Doherty Training School in Denver and three months later enlisted in the navy as an electrician. Later he was assigned to the naval academy at Annapolis where he was commissioned an ensign in the engineering division. On his discharge from the navy in 1919 he reported back to Denver and was transferred by the company to Cheyenne, Wyo., as the superintendent of the gas department of the company in that city. In 1920 he was given a similar position with the Salina Light, Power & Gas Company, now the United Power & Light



C. A. HARRISON

Corporation of Kansas, and in 1922 he was transferred back to Denver as the superintendent of gas distribution, a position which he held until his recent promotion. In his new capacity he will have charge of tax, rates, claims, personnel, transportation and other miscellaneous departments coming under the supervision of the general superintendent. Mr. Harrison has been a member of the Rocky Mountain Committee on Public Utility Information for several years and has been active also in utility association work.

J. C. Carey, Southern California Edison Company, Los Angeles, has been transferred from the general office, where he has been a distribution engineer, to the Santa Monica district of the company where he will be assistant district superintendent. Mr. Carey joined the Edison company in 1918.

F. G. Philo has been appointed superintendent of steam generation for the Southern California Edison Company, Los Angeles, replacing R. B. Kellogg, who has resigned. Mr. Philo joined the Edison company very recently, coming from Stone & Webster, Inc., an organization with which he had been connected for a number of years as an efficiency engineer.

Clare N. Stannard, vice-president and general manager, John E. Loiseau, secretary, and V. L. Board, general superintendent, all executives and directors of the Public Service Company of Colorado, lately attended a conference of Doherty company officials in New York City. While in the East they attended the American Gas Association convention in Atlantic City.

Berkeley H. Snow, Northwest editor of the Journal of Electricity, Portland, was in Spokane lately.

C. L. Titus, Wyoming manager for the Mountain States Telephone & Telegraph Company, and president of the Wyoming Utilities Association, and J. A. Clay, general manager of the Western Colorado Power Company, at Durango, Colo., attended the meeting of the Rocky Mountain Committee on Public Utility Information in Denver late in October.

R. G. Chamberlain, district manager, Hurley Machine Company, Seattle, visited Spokane lately on business.

Theo. Schou, chief engineer, The Ideal Electric & Manufacturing Company, Mansfield, Ohio, has returned from a four-months sojourn in Europe.

H. H. Schoolfield, chief engineer, Pacific Power & Light Company, Portland, left not long ago for New York where he expects to spend about a month on business for his company.

D. I. Cone, protection engineer, Pacific Telephone & Telegraph Company, San Francisco, lately spent two weeks in Portland on matters pertaining to inductive co-ordination in the Oregon division.

F. S. Mills, vice-president, Curtis Lighting of California, Inc., Los Angeles, and F. E. Hastings, treasurer, recently spent some time in San Francisco discussing sales policies for 1926 with local representatives.

Harry W. Grant, superintendent of transportation for the Southwestern district of the Puget Sound Power & Light Company in Everett, Wash., since Jan. 1, 1924, has resigned to go into private business. He had been with the company since 1906. T. F. Marsh, former superintendent of city lines of Puget Sound Power & Light Company in Everett, has succeeded Mr. Grant.

B. J. Wildman, Pacific Coast manager, Moe-Bridges Company, with headquarters in San Francisco, left recently for a trip to Chicago and the company's factory at Milwaukee.

James Squires, division sales manager for the Pacific Gas and Electric Company at Marysville, and Frank Bevans, lighting sales engineer of the same division, attended the Illuminating Engineering Society's meeting held recently in San Francisco.

C. J. Green, since 1925 chief engineer of the Public Service Commission of Oregon, has been appointed assistant chief accountant-engineer of the Federal Power Commission, Washington, D. C. He was born in July, 1882, at Hillsdale, Mich., where he received his early education. In 1904 he went to the Michigan Agricultural College, Lansing, spending one year there in the civil engineering course. The following three years were spent at the University of Michigan, Ann Arbor, where he received the degree of B.S. in civil engineering in 1908. A year of post-graduate work in electrical engineering at this institution followed, and at a later time he completed a course in public utility accounting given by the University of Oregon, Extension Division. After some time spent in field work in irrigation and railroad construction, he entered the employ of the Mt. Hood Railway & Power Company, Portland, as commercial engineer. In June, 1911, he took a simi-



C. J. GREEN

lar position with the Portland Railway Light & Power Company, remaining until October, 1912, and January of the following year found him on the engineering staff of the Public Service Commission of Oregon. Here he was engaged principally in analyzing inventories and appraising hydroelectric properties until July, 1917, when he entered the army for war service. After sixteen months service with the 39th Artillery, C.A.C., he again returned to the Oregon commission, this time as chief engineer. His appointment to his present position with the Federal Power Commission was confirmed last November. It is expected that he will spend much of his time on the Pacific Coast in connection with administering federal regulations affecting hydroelectric properties.

Obituary

A. E. Coney, of the firm of Coney & Kuchel, electrical contractors and motor dealers of San Francisco, was killed in an automobile accident in that city on Dec. 5.

TRADE NOTES

The Major Equipment Co., Inc., Chicago, has issued Bulletin No. 5, "Major Floodlight Unit," setting forth the advantages of that unit. The illustrations are particularly attractive, color plates showing color lighting in theaters, exterior floodlighting, spotlighting in show windows and industrial floodlighting as in railroad yards. The booklet emphasizes the construction, adaptability, reflecting power and method of the focusing unit for which the highest floodlighting efficiency is claimed. List prices and dimensions are given. The Major Equipment Company is represented in San Francisco, Los Angeles, Portland and Seattle by the H. B. Squires Company.

Holzwasser, Inc., located at Fifth and Broadway, San Diego, has been appointed agent for the Electro-Kold Corporation and will handle this refrigerator line exclusively in San Diego. The department will be in charge of C. H. Robbins.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, describes carbon circuit breakers for industrial installations in its circular No. 1705-A. A new automatic change-over switch, type M, is described in leaflet No. 20234 just issued by the company.

Elwell-Parker Electric Company, Cleveland, has developed a new type of portable battery-driven furnace charger which it is claimed is both a time and labor-saver as well as an economizer of furnace heat.

Ward Electric Company, Mount Vernon, N. Y., has issued bulletin 69 on Vitrohm battery-charging equipment. It contains a complete price list.

Uehling Instrument Company, Paterson, N. J., has perfected recently a recording instrument known as the waste meter. With its aid the fuel wasted readily may be determined either in dollars and cents, in B.t.u. or in per cent of the fuel burned during any time interval.

The O. C. White Company, Worcester, Mass., has issued catalog No. 26 which contains a complete description of the White adjustable electric light fixtures in applied illumination.

Hayes Electric Service recently has been opened by P. Z. Hayes at 711 E. Mariposa Street, Altadena, Calif. Mr. Hayes will specialize on wiring, he having recently completed wiring two hundred and fifty homes built in Altadena by the E. P. Janes Company.

John F. Winn, formerly operating an electric store at 30 North Greenwood Avenue, Pasadena, has opened a new store at 1936 E. Colorado Boulevard and is specializing on lighting fixtures.

E. W. Taylor has opened a new store at 829 E. Colorado Boulevard, Pasadena, where he is specializing on sales of Zenith washers and Eureka cleaners. Mr. Taylor was formerly sales manager of the Home Appliance Company, also "Schleuters" Maytag Store in Pasadena.

The Appleton Electric Company, Chicago, has opened a Seattle branch office at 420 Polson Building, with C. H. Shoemaker, the firm's representative in Seattle for four years, in charge. The branch carries a complete factory stock of outlet boxes, covers, switch boxes, locknuts, bushings, service fittings and complete Unilet fitting line.

Electric Supply Company, Oakland, Calif., recently has opened another supply house in San Francisco, where it will handle a full line of radio sets, radio parts and electrical specialties. The concern is located at 1063 Howard Street.

The Brown Instrument Company, Philadelphia, has opened new offices at 215 East New York Street, Indianapolis, in charge of J. E. Green, and at 1108 Hippodrome Building, Cleveland, in charge of G. S. Frazee.

The F. W. Wakefield Brass Company, Vermilion, Ohio, has developed a new and attractive form of portable bracket which it claims "attaches anywhere, any way." It is known as the "Attachette."

The Reliable Electric Company after having been in business for three years without a retail store location, has equipped one at 1303 Broadway in Denver. Morris R. Price is the proprietor.

The John Hancock Electrical Company has closed its retail display room at 1420 Sixteenth Street in Denver and has arranged a lighting-fixture display at the factory, 1412 Wazee Street. Metal objects of art and silver plating have been added to the line of the Hancock company.

The Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has opened a new district office in Lima, Peru, in charge of W. G. Bolton. This office, as well as the one at Oruro, Bolivia, is a branch of the company's office at Santiago, Chile, of which W. R. Judson is manager. The Oruro office is in charge of P. G. Gilliard, succeeding Erling Winsnes, who has returned to the United States.

Electro-Kold Corporation, Spokane, Wash., has appointed the McNally Company, 101 W. Colorado Street, Pasadena, Calif., to handle its product in that city.

Chicago Fuse Manufacturing Company, Chicago, has issued a convenient motor-rating card for posting in industrial plants where electric motors are used. Besides giving the full-load current, the correct ratings of starting fuses and running fuses for properly protecting different types and sizes of motors are indicated.

The Okonite Company, Passaic, N. J., has issued a new illustrated booklet containing data on splices and tapes for rubber-insulated wires. The importance of a perfect splice, the important properties of tape, how to recognize these properties, and how to make a perfect splice are the subjects covered in the booklet.

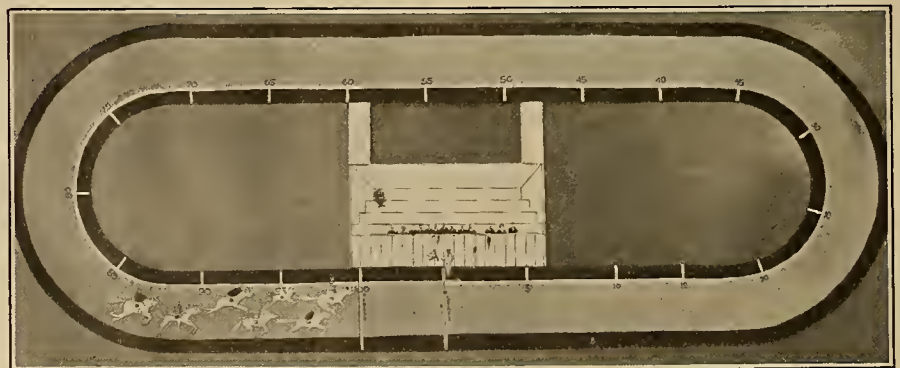
Magnetic Signal Company, Los Angeles, has issued catalog C, giving a complete description, with photographs and drawings, of its magnetic wigwag crossing flagman with signal accessories and supplies.

The Wagner Electric Corporation, 538 First Avenue South, Seattle, will move on Jan. 1 to new quarters at 1919 First Avenue South where it will have 2,000 additional square feet of floor space in a new two-story concrete building. M. E. Cundall is Northwest district manager.

The Kuhlman Electric Company, Bay City, Mich., has awarded a contract to the Henry G. Webber Construction Company for an addition to the Kuhlman factory. The new addition will cover an area of 75 x 250 ft.

Automatic Electric Washer Company, Newton, Iowa, has announced a new model, known as No. 264. The manufacturer claims the most noticeable improvement in this new model is its attractive olive green cabinet, completely enclosing all mechanism below the tub. No. 264 also has a new type wringer and the cabinet is finished in "Duco". The highly polished copper tub, tinned inside, which is easy to keep clean and drains itself, is also one of the attractive features of this new washer.

Power Plant Specialty Company, Chicago, has issued bulletin 110, which contains data on water for boiler-feed use under conditions of high pressures and overloads.



Tijuana racing reason opening? Not at all. Merely a novel method of stimulating interest among the sales people in its Salt Lake division was this miniature race track installed by the Utah Power & Light Company in the basement of its Salt Lake store. The course was marked by numbers, representing per cent of quota on range sales, and each salesman was shown mounted on a flying steed. Each rider moved nearer the 100 per cent figure (shown at the finish) in accordance with the number of range sales he made each day. The interest in the race was not confined entirely to the sales force, as was evidenced by the fact that a number of employees of other departments followed the contest each day to determine the positions of the riders.

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